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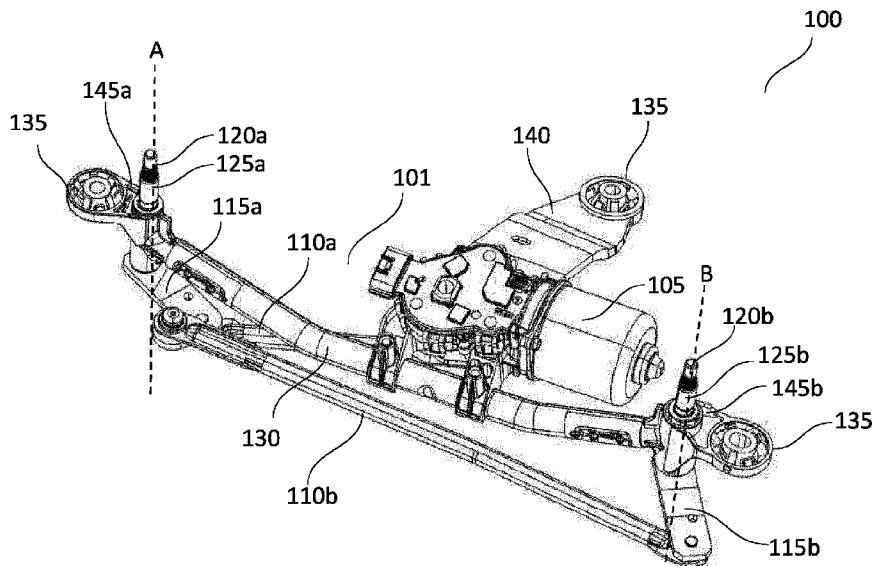


Fig.1

(57) Abstract: The present invention relates to a supporting device (135) for attaching a component (140, 145a, 145b) of a wiper assembly (100) to a vehicle body (160), the supporting device (135) being formed with and extending from the at least one component (140, 145a, 145b). The supporting device (135) comprises an annular housing (150a), a central core element (150b) configured to be attached to a body of a vehicle, and at least one damping element (150c) suspending the central core element (150b) within the annular housing (150a), the at least one damping element (150c) extending radially from the central core element (150b) to the annular housing (150a), the at least one damping element (150c) being formed integrally with the annular housing (150a) and the central core element (150b).

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SUPPORTING DEVICE FOR A WINDSCREEN WIPER MOUNTING ASSEMBLY

TECHNICAL FIELD

The present invention relates to components for a wiper mounting assembly for a motor vehicle, and more particularly to a supporting device for a windscreen wiper mounting
5 assembly for a windscreen of a motor vehicle.

STATE OF THE ART

Windscreen wiper systems are used in motor vehicle and the like, during rainy conditions and for cleaning the windscreen of any dirt or water particles, to enable the
10 motor vehicle operator to see properly through the front and rear windscreens of the motor vehicle. The wiper system usually consists of a wiper arm, which moves back and forth at an angle, elongated wiper blades and a windscreen wiper drive linkage. These wiper blades rub against the windscreen and evacuate water out of the driver's field of vision. The wiper arm of each wiper blade is connected by its end opposite to the wiper blade to
15 the windscreen wiper drive linkage for its rotational drive. A motor is coupled to the windscreen wiper drive linkage comprising a pivot assembly, which in turn drives the wiper arms and blades.

Further, conventional wiper systems may be provided with shock absorbers at fixation points, for example, at a pivot housing in order to absorb vibrations and impacts
20 on the systems caused by the arms and blades. Such shock absorbers typically include two components such as a rubber grommet and a spacer, for instance, a metallic spacer assembled in the rubber grommet. These shock absorbers may produce noise by friction between their component parts. Thus, the conventional wiper systems require additional parts to effectively absorb vibrations and impacts. Hence, the conventional wiper systems
25 require more number of parts, and therefore resulting in increasing complexity and cost. In addition, the linkage losses may be increased with the increase in the number of parts, and hence the efficiency of the system may be reduced. Hence, it would be desirable to reduce the number of parts in the wiper system to reduce design complexity and further to increase anti-vibration and shock absorbing efficiency.

SUMMARY OF THE INVENTION

An object of the invention is to alleviate the problems raised by the prior arts. To be more precise, an object of the invention is to provide a windscreen wiper system having at least one supporting device provided with an integrated damping element to absorb vibrations and impacts on the system.

Another object of the present invention is to provide a supporting device for a wiper system that uses minimal number of parts to absorb vibrations and impacts on the windscreen wiper system.

Another object of the present invention is to provide a supporting device to absorb vibrations and impacts on the windscreen wiper system, without using a rubber grommet and a spacer.

To achieve these objectives, the present invention provides a supporting device for attaching a component of a wiper assembly to the body of a vehicle, the supporting device being formed with and extending from the at least one component.

According to the invention, the supporting device comprises an annular housing, a central core element configured to be attached to a body of a vehicle, and at least one damping element suspending the central core element within the annular housing, the at least one damping element extending radially from the central core element to the annular housing, and the at least one damping element being formed integrally with the annular housing and the central core element.

In the proposed invention, a rubber grommet and a spacer of a conventional shock absorber is replaced with the at least one damping element integrated within the supporting device. Advantageously, this simplifies the assembly process, reducing complexity and cost. In addition, the linkage losses would be reduced as the proposed invention replaces the rubber grommet and the spacer with the damping element integrated in the supporting device. Thereby, the anti-vibration and shock absorbing efficiency can be enhanced with the proposed invention compared to the conventional shock absorbers of the wiper system.

According to one characteristic of the present invention, the central core element is formed as a hollow cylinder. The central core element is configured to be attached to the body of the vehicle.

According to one characteristic of the present invention, the at least one damping element comprises at least two web portions arranged at an angle to each other and to the central core element and the annular housing. For instance, the angle between two web portions can be oblique. In another instance, the angle between two web portions can be a right angle. Advantageously, the two web portions may be configured to flex under load to act as the anti-vibration and shock-absorbing member, the flexure being localized to the angle between the at least two web portions. Further, the two web portions may be designed in a folded shape that would allow axial and radial movements of the wiper mechanism. It is to be noted that the shape of the two web portions can be varied according to rigidity necessity.

According to one characteristic of the present invention, the supporting device comprises a plurality of damping elements arranged symmetrically around a circumference of the central core element. Advantageously, with this arrangement, the vibrations can be absorbed in more effective manner. For instance, with this arrangement, the damping elements can be well aligned with the motion so that the damping elements can absorb the kinetic energy in both the directions as much as possible. Further, based on the direction of vibrational motion, the damping elements can be configured symmetrically in such a way that the damping elements can be aligned with the direction of the motion, for example, along a longitudinal axis of the vehicle.

According to one characteristic of the present invention, the supporting device comprises a plurality of damping elements arranged around a circumference of the central core element at uniform angular intervals. Advantageously, with this arrangement, vibrations can be effectively absorbed in all directions. That is to say, the vibrations coming from all directions are effectively absorbed by arranging the damping element at uniform angular intervals around the central core element. Further, this arrangement facilitates all the damping elements absorbing vibrations uniformly. That is to say, each damping element absorbs the vibrations and shocks uniformly. Hence, the central core element can be moved freely and precisely in all the directions.

According to one characteristic of the present invention, the plurality of damping elements are arranged in diametrically opposed pairs. With this arrangement, an even

number of damping elements is arranged around the circumference of the central core element, offering simplified construction and effective vibration damping.

According to one characteristic of the present invention, the angle formed by the web portions of any one of the plurality of damping elements opens in an opposite
5 direction to the angle formed by the web portions of at least one adjacent damping element. Advantageously, this arrangement of the damping elements allows equalizing and balancing the forces due to axial and radial movements of the windscreen wiper system.

According to one characteristic of the present invention, the angles formed by the
10 web portions of each of the plurality of damping element open in the same direction. In one instance, the web portions of the plurality of damping elements open in an upward direction. In another instance, the web portions of the plurality of damping elements open in a downward direction. Advantageously, this arrangement permits designing the supporting device in accordance with direction of the vibrations of the windscreen wiper
15 system.

According to one characteristic of the present invention, the at least one damping element is configured to deflect when a force is applied to the component of the wiper assembly. For instance, the direction of the deflection of the damping element depends on the direction of the force applied to the component of the wiper assembly.
20 Advantageously, the two web portions of each damping element may be configured to flex under load to act as the anti-vibration and shock-absorbing member.

According to one characteristic of the present invention, the component of the wiper assembly is a wiper motor bracket for retaining a wiper motor or a pivot housing for a wiper arm.

25 According to one characteristic of the present invention, the rigidity of the at least one damping element is selected as a function of an operational vibration mode of the component of the wiper assembly.

According to one characteristic of the present invention, the supporting device is fabricated from plastic or metal.

30 According to one characteristic of the present invention, the supporting device is fabricated from plastic filled with a reinforcing matrix.

According to one characteristic of the present invention, the central core element is fixed to the vehicle body by a fastener.

According to one characteristic of the present invention, the fastener is a nut and bolt assembly.

5 The present invention also relates to a windscreen wiper drive linkage, which comprises the supporting device as previously disclosed.

BRIEF DESCRIPTION OF THE INVENTION

To complete the description and to provide a better understanding of the invention,
10 a set of drawings is provided. The drawings form an integral part of the description and illustrate an embodiment of the invention, which should not be construed as restricting the scope of the invention, but only as an example of how the invention can be carried out. The drawings comprise the following characteristics.

Fig. 1 shows a perspective view of a windscreen wiper system having a
15 windscreen wiper drive linkage and a wiper motor, according to an embodiment of the present invention.

Fig.2a shows a supporting device for attaching a pivot housing of the windscreen wiper drive linkage to a vehicle body, according to an embodiment of the present invention.

20 Fig.2b shows a supporting device for attaching a motor bracket to a vehicle body, according to an embodiment of the present invention.

Fig.3a shows a cross sectional view of the supporting device, according to one embodiment of the present invention.

25 Fig.3b shows a cross sectional view of the supporting device, according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings.

30 The illustrative embodiments of the present invention are not meant to be limiting. It may be readily understood that certain aspects of the disclosed embodiments of the

present invention can be arranged and combined in wide variety of different configurations, all of which are contemplated herein.

A windscreen wiper system is generally used in motor vehicles to clean a windscreen of the vehicle. The windscreen wiper system is shown in Fig.1. The windscreen wiper system 100 comprises a drive unit and windscreen wiper drive linkage 101, which transfers drive from a wiper motor 105 of the drive unit to a pair of wiper arms (not shown in Figures), providing reciprocating movement of the wiper arms. Wiper blades (not shown in Figures) are attached to the wiper arms for wiping the windscreen of the motor vehicle. The wiper blades may be placed in abutment with the windscreen, such that the wiper blades are capable of wiping the windscreen of the motor vehicle. The windscreen wiper drive linkage 101 may be provided for moving the wiper arms between an in wipe position, an out wipe position, and a parked position.

Fig.1 depicts the windscreen wiper drive linkage 101, according to an embodiment of the present invention. The windscreen wiper drive linkage 101 comprises a first link rod 110a transferring a drive from the wiper motor 105 to a first driving lever 115a and via a second link rod 110b to a second driving lever 115b.

A first wiper arm (not shown in Figures) is fixed to a first pivot shaft 120a and the second wiper arm (not shown in Figures) is fixed to a second pivot shaft 120b. Then, a drive is transferred via the pivot shafts 120a, 120b into a reciprocating movement of the first wiper arm and the second wiper arm. The first wiper arm rotates about the rotational axis A of the first pivot shaft 120a and the second wiper arm rotates about the rotational axis B of the second pivot shaft 120b.

The windscreen wiper drive linkage 101 presented in Fig. 1 further comprises a first pivot shaft housing 125a and a second pivot shaft housing 125b. The first pivot shaft housing 125a and the second pivot shaft housing 125b support a first pivot shaft 120a and a second pivot shaft 120b, respectively. The first pivot shaft 120a has a first rotational axis A around which the first pivot shaft 120a rotates in the first pivot shaft housing 125a. The second pivot shaft 120b has the second rotational axis B around which the second pivot shaft 120b rotates in the second pivot shaft housing 125b.

The wiper motor 105 may be coupled with the windscreen wiper drive linkage 101 via a coupling element (not shown in Figures). The coupling element is linked to one

longitudinal end of the first link rod 110a. The windscreen wiper system 100 further comprises a frame tube 130 for supporting the first pivot shaft housing 125a, the second pivot shaft housing 125b and the wiper motor 105. The first link rod 110a and the second link rod 110b may be driven by the wiper motor 105 to perform a reciprocating linear movement.

Further, as can be seen from Fig.1, the windscreen wiper system 100 comprises at least one supporting device 135 for attaching a component of the windscreen wiper system 100 to the vehicle body 160 (shown in Fig.3a). For example, the component of the windscreen wiper system 100 is a wiper motor bracket 140 for retaining the wiper motor 105 or a pivot housing 145a, 145b for a wiper arm.

As shown in Fig.1, the supporting device 135 being formed with and extending from the at least one component 140, 145a, 145b. In an aspect, the supporting device 135 may be fabricated from plastic or metal. In another aspect, the supporting device may be fabricated from plastic filled with a reinforcing matrix. In a non-limiting example, a polyamide, polypropylene, polyoxymethylene, or polyethylene resin may be filled with a matrix of glass or carbon fibers at 30 to 40 percent by weight. The skilled person will be capable of selecting the optimal material according to the particular design in question.

Fig.2a shows the supporting device 135 for attaching a pivot housing of the wiper drive linkage 101 to a vehicle body, according to an embodiment of the present invention, and Fig.2b shows the supporting device 135 for attaching the motor bracket 140 to the vehicle body, according to an embodiment of the present invention. As can be seen from the Fig.2a and the Fig.2b, the supporting device 135 comprises an annular housing 150a, a central core element 150b configured to be attached to the vehicle body 160, and at least one damping element 150c suspending the central core element 150b within the annular housing 150a. The at least one damping element 150c extends radially from the central core element 150b to the annular housing 150a, and the at least one damping element 150c is formed integrally with the annular housing 150a and the central core element 150b. The central core element 150b may be formed as a hollow cylinder, and may be configured to be attached to the vehicle body 160 by a fastener. For example, the fastener may be a nut and bolt assembly.

In an embodiment, the at least one damping element 150c comprises at least two web portions 150ca, 150cb arranged at an angle to each other and to the central core element 150b and the annular housing 150a. For instance, the angle between two web portions 150ca, 150cb may be oblique. In an aspect, the angle between two portions 5 150ca, 150cb may be an acute angle. In another aspect, the angle between two web portions 150ca, 150cb may be an obtuse angle. Further, in another aspect, the angle between two web portions 150ca, 150cb may be a right angle. It is understood to a person skill in the art that the angle between the two web portions 150ca, 150cb can be varied based on the requirements.

10 According to a possible embodiment of the present invention, the at least one damping element 150c may be configured to deflect when a force is applied to the component of the wiper assembly 100. For instance, the direction of the deflection of the damping elements 150c depend the direction of the force applied to the component of the wiper assembly 100. Advantageously, the two web portions 150ca, 150cb of each 15 damping element 150 may be configured to flex under load to act as the anti-vibration and shock-absorbing member. The two web portions 150ca, 150cb may be designed in a folded shape that would allow axial and radial movements of the wiper mechanism. It is to be noted that the shape of the two web portions 150ca, 150cb may be varied according to the rigidity necessity for a particular application. The rigidity of the damping 20 elements 150 may be selected as a function of an operational vibration mode of the component of the wiper assembly 100.

According to an embodiment of the present invention, the damping elements 150c may be arranged symmetrically around a circumference of the central core element 150b. Advantageously, with this arrangement, the vibrations can be absorbed in a more 25 effective manner. For instance, with this arrangement, the damping elements 150c can be aligned with oscillating motion so that the damping elements 150c can absorb the kinetic energy as much as possible. Further, based on the direction of vibrational motion, the damping elements 150c can be configured symmetrically in such a way that the damping elements 150c are aligned with the direction of the motion, for example, along 30 a longitudinal axis of the vehicle.

Alternatively, or additionally, in other possible embodiments it may be preferable to align the arrangement of the damping elements 150c according to an expected direction of vibration.

According to another embodiment of the present invention, the damping elements
5 150c may be arranged around a circumference of the central core element 150b at uniform angular intervals. Advantageously, with this arrangement, vibrations can be effectively absorbed in all directions. That is to say, vibrations coming from all directions can be effectively absorbed by arranging the damping elements 150c at uniform angular intervals around the central core element 150b. Further, this arrangement would facilitate
10 all the damping elements 150c to absorb vibrations uniformly. That is to say, each damping element 150c absorbs the vibrations and shocks uniformly. Hence, the central core element 150b can be moved freely and precisely in all the directions.

In an embodiment, the plurality of damping elements 150c may be arranged in diametrically opposed pairs. With this arrangement, an even number of damping
15 elements 150c are be arranged around the circumference of the central core element 150b, offering simplified construction and effective vibration damping. In another, alternative embodiment, an odd number of damping elements 150c may be arranged around the circumference of the central core element 150b.

Fig.3a shows a cross sectional view of the supporting device, according to one
20 embodiment of the present invention. Fig.3b shows a cross sectional view of the supporting device, according to another embodiment of the present invention. According to an embodiment of the present invention, the angle formed by the web portions 150ca, 150cb of any one of the plurality of damping elements 150c opens in an opposite direction to the angle formed by the web portions 150ca, 150cb of at least one adjacent damping
25 element 150c, as shown in the Fig.3b. Advantageously, this arrangement of the damping elements 150c allows equalizing and balancing the forces due to axial and radial movements of the windscreen wiper system 100. According to another embodiment of the present invention, the angles formed by the web portions 150ca, 150cb of each of the plurality of damping elements 150 open in the same direction, as shown in the Fig.3a.

30 Thus, in the proposed invention, the at least one damping element 150c is integrated within the supporting device 135. Advantageously, this would result in reducing

assembly process, complexity, and cost. In addition, the linkage losses are reduced as the proposed invention replaces the rubber grommet and the spacer with the damping element 150c integrated in the supporting device 135. Thereby, the anti-vibration and shock absorbing efficiency can be enhanced with the present invention, as compared to the conventional shock absorbers of the wiper system.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included in the scope of the following claims.

Claims:

1. A supporting device (135) for attaching a component (140, 145a, 145b) of a wiper assembly (100) to the body of a vehicle, the supporting device (135) being formed with and extending from the at least one component (140, 145a, 145b), characterized in that the supporting device (135) comprises an annular housing (150a), a central core element (150b) configured to be attached to a body of a vehicle, and at least one damping element (150c) suspending the central core element (150b) within the annular housing (150a), the at least one damping element (150c) extending radially from the central core element (150b) to the annular housing (150a), the at least one damping element (150c) being formed integrally with the annular housing (150a) and the central core element (150b).
2. The supporting device (135) of the previous claim, wherein the central core element (150b) is formed as a hollow cylinder.
3. The supporting device (135) as claimed in either of the preceding claims, wherein the at least one damping element (150c) comprises at least two web portions (150ca, 150cb) arranged at an angle to each other and to the central core element (150b) and the annular housing (150a).
4. The supporting device (135) as claimed in any one of the preceding claims, wherein the supporting device (135) comprises a plurality of damping elements (150c) arranged symmetrically around a circumference of the central core element (150b).
5. The supporting device (135) as claimed in any one of the preceding claims, wherein the supporting device (135) comprises a plurality of damping elements (150c) arranged around a circumference of the central core element (150b) at uniform angular intervals.

6. The supporting device (135) as claimed in any one of claims 4 or 5, wherein the plurality of damping elements (150c) are arranged in diametrically opposed pairs.
7. The supporting device (135) of the preceding claim, wherein the angle formed by the web portions (150ca, 150cb) of any one of the plurality of damping elements (150c) opens in an opposite direction to the angle formed by the web portions (150ca, 150cb) of at least one adjacent damping element (150c).
8. The supporting device (135) of any one of claims 4 to 6, wherein the angles formed by the web portions (150ca, 150cb) of each of the plurality of damping element (150) open in the same direction.
9. The supporting device (135) as claimed in any one of the preceding claims, wherein the at least one damping element (150c) is configured to deflect when a force is applied to the component (140, 145a, 145b) of the wiper assembly (100).
10. The supporting device (135) as claimed in any one of the preceding claims, wherein the component (140, 145a, 145b) of the wiper assembly (100) is a wiper motor bracket (140) for retaining a wiper motor (105) or a pivot housing (145a, 145b) for a wiper arm.
11. The supporting device (135) as claimed in any of the preceding claims, wherein the rigidity of the at least one damping element (150c) is selected as a function of an operational vibration mode of the component (140, 145a, 145b) of the wiper assembly (100).
12. The supporting device (135) as claimed in any one of the preceding claims, wherein the supporting device (135) is fabricated from plastic or metal.
13. The supporting device (135) of the preceding claim, wherein the supporting device (135) is fabricated from plastic filled with a reinforcing matrix.

14. The supporting device (135) as claimed in any one of the preceding claims, wherein the central core element (150b) is fixed to the vehicle body by a fastener.
15. The supporting device (135) of the preceding claim, wherein the fastener is a nut and bolt assembly.
16. A windscreen wiper drive linkage comprising the supporting device (135) as claimed in any one of preceding claims 1 to 15.

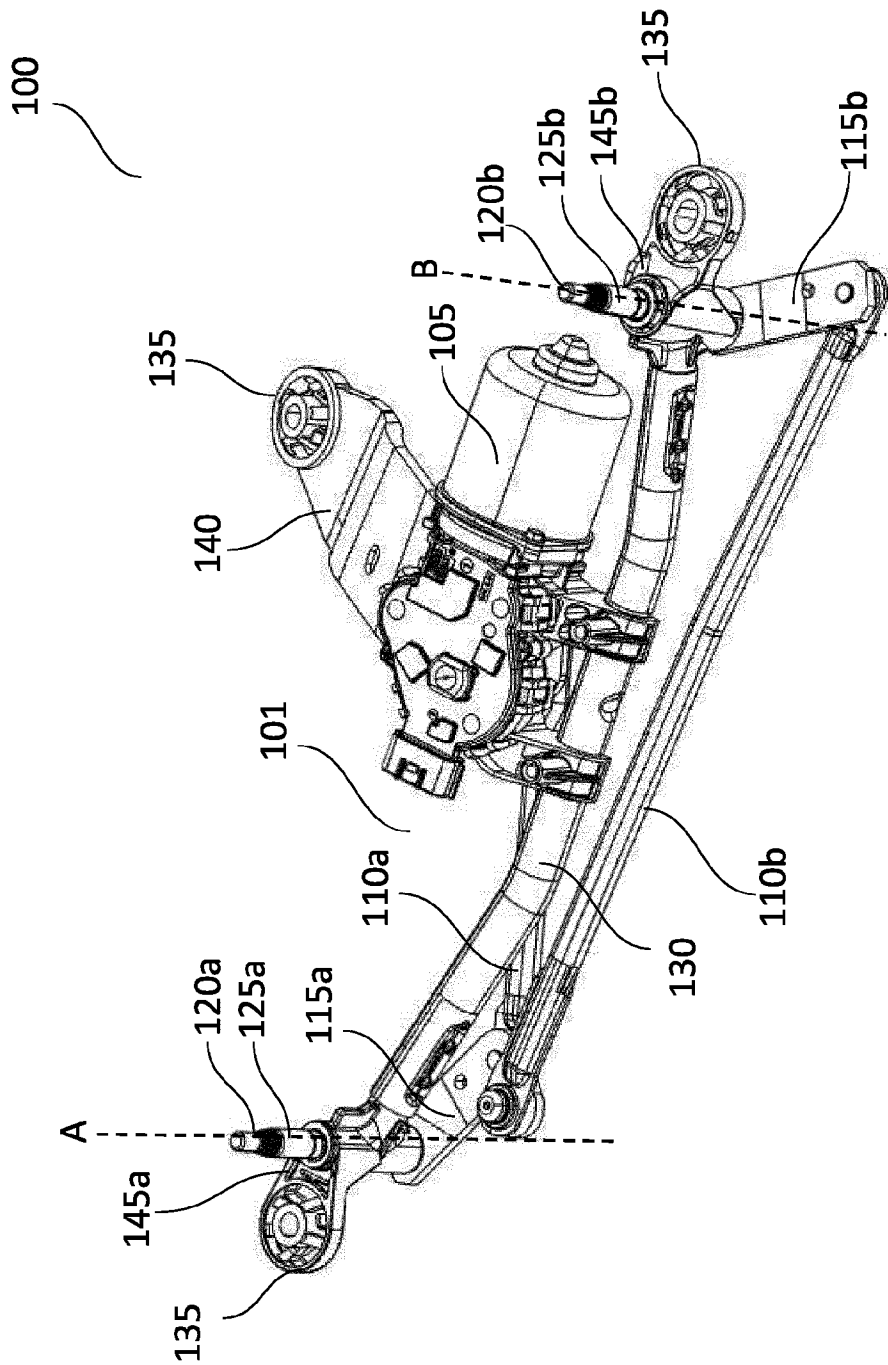


Fig.1

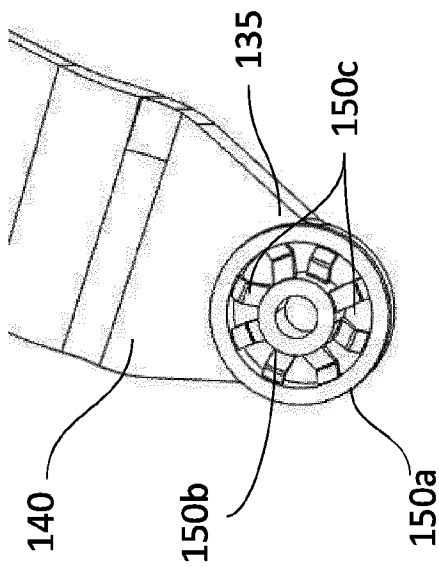


Fig.2b

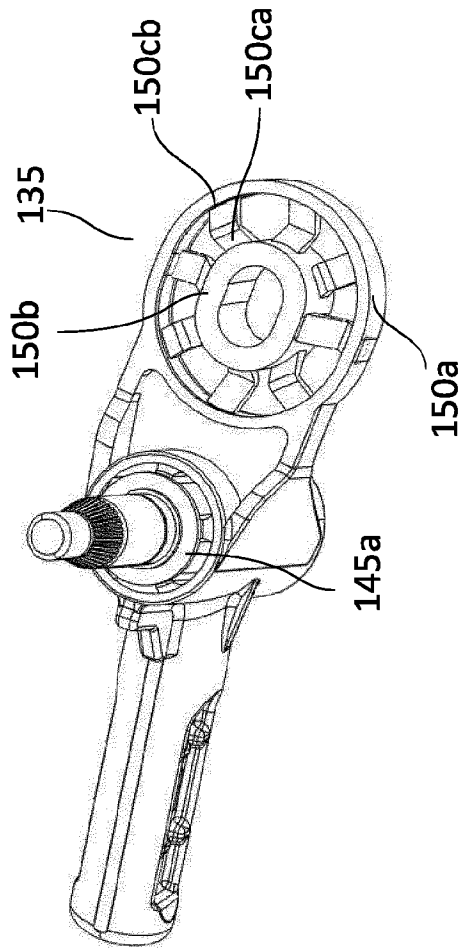


Fig.2a

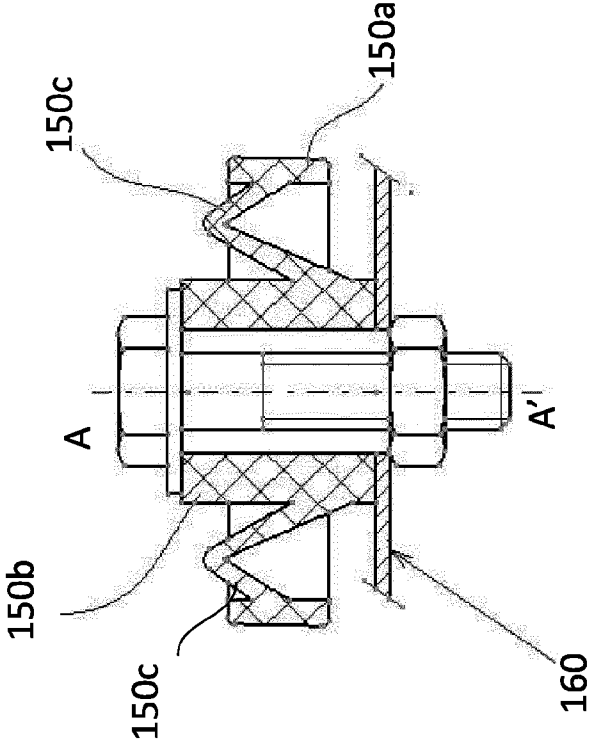


Fig. 3a

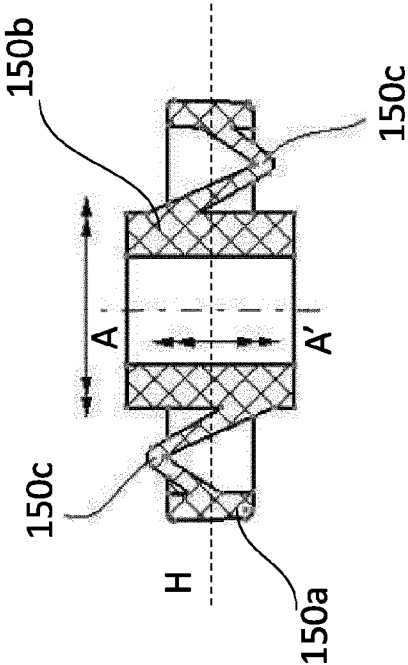


Fig. 3b

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2023/060859

A. CLASSIFICATION OF SUBJECT MATTER**INV. B60S1/04****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)

B60S

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 799 142 B1 (TEVES GMBH ALFRED [DE]) 22 September 1999 (1999-09-22)	1-6, 8-12, 14-16
A	paragraph [0007] - paragraph [0010] paragraph [0015] - paragraph [0021]; figures 1-6 -----	7, 13
X	US 2007/124887 A1 (REID ALEX [US] ET AL) 7 June 2007 (2007-06-07)	1, 2, 4, 12, 14-16
A	paragraph [0043] - paragraph [0047]; figures 6-10 -----	3, 5-11, 13
A	EP 1 219 513 B1 (FUJI HEAVY IND LTD [JP]) 5 March 2008 (2008-03-05) figures 1-8 -----	1-16



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

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17/07/2023

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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