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(54) **Title**: APPARATUS FOR POSITIONING THE SIDE MIRRORS OF A VEHICLE USING THE CENTRAL MIRROR

(57) **Abstract**: A mirror positioning apparatus includes a support arm rigidly attachable to an interior surface of a vehicle, a central mirror coupled to the support arm for pivotal movement about a sensor pivot point, the central mirror having a reflective front surface, at least one sensor for sensing pivotal movements of the central mirror about the sensor pivot point and generating sensor output signals indicative of the pivotal movements, at least one side mirror disposed on an exterior side of the vehicle, a selection mechanism for selecting one or none of the at least one side mirror to be positioned and for generating a selection signal indicative of a selected side mirror, a computer processor electronically coupled to the sensor and the selection mechanism, the computer processor being configured for receiving the selection signal and the sensor output signals and for generating side mirror position signals based on the sensor output signals, and a side mirror motor operatively coupled to each of the at least one side mirror for receiving the side mirror position signals and positioning the selected side mirror in accordance therewith.

TITLE: Apparatus for Positioning the Side Mirrors of a Vehicle Using the Central Mirror

FIELD

[0001] The present invention relates to systems and apparatus for positioning the rear view mirrors of a vehicle.

BACKGROUND

[0002] Typical electrical mirror (with memory and non memory) systems have a man machine interface (MMI), comprising a joystick and a selection switch located on the driver's armrest or door, which enables a driver to adjust the side mirrors of a vehicle. While these conventional systems work reasonably well, the conventional MMI can be inconvenient and distracting for some drivers. Accordingly, there is a need for improved systems and apparatus for positioning the side mirrors of a vehicle, and in particular, for systems and apparatus that simply the conventional MMI between the driver and the rear view mirrors.

SUMMARY

[0003] The present invention is directed to a mirror positioning apparatus, comprising a support arm rigidly attachable to an interior surface of a vehicle, a central mirror coupled to the support arm for pivotal movement about a sensor pivot point, the central mirror having a reflective front surface, at least one sensor for sensing pivotal movements of the central mirror about the sensor pivot point and generating sensor output signals indicative of the pivotal movements, at least one side mirror disposed on an exterior side of the vehicle, a selection mechanism for selecting one or none of the at least one side mirror to be positioned and for generating a selection signal indicative of a selected side mirror, a computer processor electronically coupled to the sensor and the selection mechanism, the computer processor being configured for receiving the selection signal and the sensor output signals and for generating side mirror position signals based on the sensor output signals, and a side mirror motor operatively coupled to each of the at least one side mirror for receiving the side

mirror position signals and positioning the selected side mirror in accordance therewith.

[0004] According to one aspect of the invention, the central mirror may comprise a central mirror body pivotally coupled to the support arm for pivotal movement about the sensor pivot point, and a central mirror plate rigidly attached to the central mirror body, the central mirror plate having the reflective front surface, and wherein the at least one sensor senses pivotal movement of the central mirror body about the sensor pivot point. The at least one sensor may comprise a rotation and elevation sensor mounted on the central mirror body, the rotation and elevation sensor comprising a lever arm extending away from the central mirror body, and a link arm linking the lever arm to the support arm, wherein the lever arm moves as the central mirror body is pivoted by the driver, thereby activating the rotation and elevation sensor.

[0005] According to another aspect of the invention, the central mirror may comprise a central mirror body pivotally coupled to the support arm for pivotal movement about a central mirror pivot point, and a central mirror plate pivotally coupled to the central mirror body for pivotal movement about the sensor pivot point, the central mirror plate having the reflective front surface, and wherein the at least one sensor senses pivotal movement of the central mirror plate about the sensor pivot point. The at least one sensor may comprise at least two sensor switches coupled to the central mirror body, the sensor switches being spaced from each other and positioned adjacent opposite edges of the front surface of the central mirror body, the sensor switches having actuators extending outwardly from a front surface of the central mirror body towards a rear surface of the central mirror plate, such that when the central mirror plate is pivoted about the sensor pivot point by the driver, the rear surface of the central mirror plate bears against one or more of the actuators thereby activating the sensor switches and generating the sensor output signals, whereby the driver can use the central mirror plate as a joystick to position the selected side mirror.

[0006] According to yet another aspect of the invention, the central mirror may comprise a central mirror pivot member pivotally coupled to the support arm for movement about a central mirror pivot point, a central mirror body pivotally coupled to the central mirror pivot member for pivotal movement about a sensor pivot point, and a central mirror plate rigidly attached to a front surface of the central mirror body, the central mirror plate having the reflective surface, and wherein the sensors sense pivotal movement of the central mirror body relative to the mirror body pivot member about the sensor pivot point. The at least one sensor may comprise sensor switches and sensor springs extending between the central mirror pivot member and the central mirror body, the sensor springs being configured so as to bias the central mirror body away from the sensor switches such that the sensor switches are not activated when no pressure is placed on the central mirror body by the driver, and such that slight movement of the central mirror body by the driver causes the pivotal movements of the central mirror body about the sensor pivot point, thereby activating one or more of the sensor switches.

[0007] According to a further aspect of the invention, the support arm may comprise a first support arm member rigidly attachable to an interior portion of a vehicle, and a second support arm member pivotally coupled to the first support arm member for pivotally movement about the sensor pivot point, and the central mirror may comprise a central mirror body pivotally coupled to the second support arm member for pivotal movement about a central mirror pivot point, and a central mirror plate rigidly attached to the central mirror body, the central mirror plate having the reflective front surface, wherein the at least one sensor senses pivotal movement of the second support arm member relative to the first support arm member about the sensor pivot point. The at least one sensor may comprise sensor switches and sensor springs extending between the first support arm member and the second support arm member, the sensor springs being configured to bias the second support arm member away from the sensor switches, such that the sensor switches are not activated when the second support arm member is in a rest position, and such that slight movement of the

central mirror body by the driver causes pivotal movement of the second support arm member about the sensor pivot point, thereby activating one or more of the sensor switches.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The invention will now be described, by way of example only, with reference to the following drawings, in which:

[0009] Fig. 1 is a general schematic view of a side mirror positioning apparatus made in accordance with the present invention;

[0010] Fig. 2 is a schematic top view of a side mirror positioning apparatus in accordance with a first embodiment of the invention;

[0011] Fig. 3 is a schematic side view of the side mirror positioning apparatus in accordance with the first embodiment of the invention;

[0012] Fig. 4 is a schematic top view of a side mirror positioning apparatus in accordance with a second embodiment of the invention;

[0013] Fig. 5 is a schematic side view of the side mirror positioning apparatus in accordance with the second embodiment of the invention;

[0014] Fig. 6 is a schematic top view of a side mirror positioning apparatus in accordance with a third embodiment of the invention;

[0015] Fig. 7 is a schematic side view of the side mirror positioning apparatus in accordance with the third embodiment of the invention;

[0016] Fig. 8 is a schematic top view of a side mirror positioning apparatus in accordance with a fourth embodiment of the invention; and

[0017] Fig. 9 is a schematic side view of the side mirror positioning apparatus in accordance with the fourth embodiment of the invention.

DETAILED DESCRIPTION

[0018] Referring now to Figure 1, illustrated is a mirror positioning apparatus 10 made in accordance with the present invention. The apparatus 10

comprises a support arm 15 attachable to an interior portion of the vehicle, a central mirror 11 coupled the support arm 15 for pivotal movement about a sensor pivot point 32, at least one sensor 16 for sensing pivotal movements of the central mirror 11 about the sensor pivot point 32 and for generating sensor output signals indicative of the pivotal movements, side mirrors 21 disposed on an opposite exterior side of the vehicle, a selection mechanism 17 for selecting one or none of the side mirrors 21 to be adjusted and for generating selection signals indicative of a selected side mirror 21, a computer processor 18 electronically connected to the selection mechanism 17 and the sensors 16 for receiving the sensor output signals of the sensors 16 and for generating side mirror position signals based on the sensor output signals, and side mirror motors 12 operatively coupled to each of the side mirrors 21 for receiving the position signals and positioning the side mirrors 21 in accordance therewith. The central mirror 11 may comprise a central mirror body 14 mounted to the support arm 15 for pivotal movement about a central mirror pivot point 19, and a central mirror plate 13 mounted to the central mirror body 14, having a reflective front surface 31.

[0019] The sensors 16 may comprise pressure/tensor sensors. The side mirrors 21 may comprise a side mirror housing 29 and a side mirror plate 29 mounted within the side mirror housing 29, having a reflective front surface. The side mirror motors 12 may be located within the side mirror housings 29 and configured for making rotation and elevation adjustments of the side mirrors 21.

[0020] In use, the driver uses the selection mechanism 17 to select one or none of the side mirrors 21 to be adjusted, and then moves the central mirror 11 as a joystick to position the selected side mirror 21. The driver then repeats the operation for the other side mirror 21. Once both side mirrors 21 have been positioned, the driver selects no side mirror to be adjusted and manually repositions the central mirror 11 for rearview if necessary.

[0021] The apparatus 10 of the present invention simplifies the conventional man machine interface (MMI), by focusing the interface in one

component, namely the central mirror 11, which eliminates the need for a separate joystick.

[0022] Figures 2 and 3 illustrate a side mirror positioning apparatus 20 made in accordance with a first embodiment of the invention. Apparatus 20 comprises a central mirror 11a and a sensor 16a. Central mirror 11a comprises a central mirror body 14 coupled to the support arm 15 for pivotal movement about sensor pivot point 32, and a central mirror plate 13 rigidly attached to central mirror body 14. The sensor 16a comprises rotation and elevation sensors 22, which sense pivotal movements of the central mirror body 14 about the sensor pivot point 32. The sensors 22 include a lever arm 25 extending away from the central mirror body 14, and a rigid link arm 24 that links the lever arm 25 to the mirror support arm 15. In the case of this embodiment, the central mirror body 14 pivots about a central mirror pivot 19, which is the same point as sensor pivot point 32. The selection mechanism 17 allows the driver to select one or none of the side mirrors 21 to be adjusted. If no side mirror 21 is selected, the driver can manually adjust the central mirror 11a by moving the central mirror body 14 about sensor pivot point 32 without causing side mirrors 21 to be repositioned. Data cables connect the rotation and elevation sensors 22 and selection mechanism 17 to the computer processor 18. The computer processor 18 is also connected to the side mirror motors 12 (as shown in Figure 1). The rotation and elevation sensors 22 may be linear potentiometers. Rotational potentiometers may also be used.

[0023] When the central mirror body 14 is pivoted by the driver about sensor pivot point 32 with respect to the mirror support arm 15, the rotation and elevation sensors 22 are moved by the link arm 24 and the lever 25, and thereby provide sensor output signals indicative of the changed mirror position to the computer processor 18.

[0024] For side mirror positioning purposes, the computer processor 18 is configured to map changes in the rotation and elevation of the central mirror body 14 into changes in the rotation and elevation of the selected side mirror 21.

For example, if the central mirror body 14 has a rotation range of ten (10) degrees and the side mirror 21 has rotation range of eighteen (18) degrees, a two (2) degree in change of the rotation of the central mirror body 14 will correspond to 3.6 = 2 x 18/ 10 degrees change in the selected side mirror. The same would apply for the elevation.

[0025] Figures 4 and 5 illustrate a side mirror positioning apparatus 30 made in accordance with a second embodiment of the invention. Apparatus 30 comprises a central mirror 11b and sensors 16b. Central mirror 11b comprises a central mirror body 14b pivotally coupled to the support arm 15 for pivotal movement about central mirror pivot point 19, a central mirror plate 13b pivotally attached to the central mirror body 14b for pivotal movement around a sensor pivot point 32. The sensors 16b comprise four spaced pairs of sensor switches 34 and sensor springs 36 extending between a front surface 37 of the central mirror body 14b and a rear surface 38 of the central mirror plate 13b. The sensor switches 34 are electrically connected to each other and to the selection mechanism 17 and the computer processor 18. The computer processor 18 is electrically connected to the side mirror motors 12 (as shown in Figure 1).

[0026] The sensor switches 34 may be embedded in the central mirror body 14b at locations adjacent the corners thereof and have switch actuators 35 extending outwardly from the front surface 37 of the central mirror body 14b. The sensor springs 36 are configured so as to spring load the central mirror plate 13b, such that when the central mirror plate 13b is in a normal position, without any pressure being applied thereto by the driver, the rear surface 38 of the central mirror plate 13b does not a trigger any of the switch actuators 35. The driver may select a side mirror 21 to be adjusted by using the selection mechanism 17. When pressure is applied by the driver to the central mirror plate 13b, one or more sensor switches 34 are activated, allowing the driver to use the central mirror plate 13b as a joystick to move the selected side mirror 21 in the direction in which it should be rotated and/or elevated. The sensor output signals from the triggered sensor switches 34 are transmitted to the computer processor 18, which interprets them as joystick signals. For example, if the left switch is

triggered, the computer processor 18 generates position signals that cause a side mirror motor 12 to rotate the selected side mirror 21 to the left.

[0027] Figures 6 and 7 illustrate a side mirror positioning apparatus 40 in accordance to a third embodiment of the invention. The apparatus 40 comprises a central mirror 11c and sensors 16c. Central mirror 11c comprises a central mirror pivot member 42 pivotally coupled to support arm 15 for movement about central mirror pivot point 19, a central mirror body 14c pivotally coupled to the central mirror pivot member 42 for pivotal movement around a sensor pivot point 32, and a central mirror plate 13 rigidly attached to the central mirror body 14c. The sensors 16c may comprise four pairs of sensor switches 34 and sensor springs 36 extending between a rear surface 41 of the central mirror body 14c and a front surface 43 of the central mirror pivot member 42. The sensor switches 34 may be embedded in the central mirror body 14c and have switch actuators 35 extending outwardly from the rear surface 41 of the central mirror body 14c. The sensor springs 36 are configured to bias the central mirror body 14c away from the central mirror pivot member 42, such that when the central mirror body 14c is in a normal position, without any pressure being applied thereto by the driver, the rear surface 41 of the central mirror body 14c does not a trigger any of the switch actuators 35. The sensor switches 34 are electrically connected to each other and to the selection mechanism 17 and the computer processor 18. The computer processor 18 is electrically connected to the side mirror motors 12 (as shown in Figure 1).

[0028] When the driver exercises slight movements of the central mirror body 14c, the central mirror body 14c pivots around the sensor pivot point 32, causing one or more of the switch actuators 35 to touch the front surface 43 of the central mirror pivot member 42, which triggers one or more of the sensor switches 34. This allows the driver to use the central mirror body 14c as a joystick to indicate the direction in which the selected side mirror 21 should be rotated or elevated. The sensor output signals generated by the sensor switches 34 are transmitted to the computer processor 18, which interprets the signals as joystick trigger information. For example, if the left sensor switch 34 is triggered,

the selected side mirror 21 must rotate left, etc. When the driver does not want to use the central mirror body 14c as joystick but needs to position the central mirror plate 13 for rearview purposes, the driver may exercise larger movements with a larger force. In this case, the central mirror body 14c pushes on the central mirror pivot member 42, and when its movement range is exhausted, it will start rotating around the central mirror pivot point 19, allowing central mirror plate 13 to be positioned.

[0029] Figures 8 and 9 illustrate a side mirror positioning apparatus 50 in accordance with a fourth embodiment of the invention. The apparatus 50 comprises a support arm 15d, central mirror 11d, and sensors 16d. Support arm 15d comprises a first support arm member 52 rigidly attachable to an interior portion of a vehicle, and a second support arm member 53 pivotally coupled to the first support arm member 52 for pivotally movement about the sensor pivot point 32. The central mirror 11d comprises a central mirror body 14 pivotally coupled to the second support arm member 53 for pivotal movement about a central mirror point 19, and a central mirror plate 13 rigidly attached to the central mirror body 14. The sensor 16d comprises sensor switches 34 and sensor springs 36 extending between the first support arm member 52 and the second support arm member 53. The sensor springs 36 are configured to bias the second support arm member 53 away from the sensor switches 34, such that the sensor switches 34 are not activated when the second support arm member 53 is in a rest position. The sensor switches 34 are electrically connected to each other and to the selection mechanism 17 and the computer processor 18. The computer processor 18 is electrically connected to the side mirror motors 12 (as shown in Figure 1).

[0030] When the driver exercises slight movements of the central mirror body 14, the second support arm member 53 pivots around the sensor pivot point 32, causing one or more sensor switches 34 to trigger by touching the first support arm member 52. This allows the driver to use the central mirror body 14 as a joystick to indicate the direction in which the selected side mirror 21 should be rotated or elevated. The sensor output signals generated by the sensor

switches 34 are transmitted to the computer processor 18 where the computer processor interprets the signals as joystick information. When the driver does not want to use the central mirror body 14 as joystick for positioning a side mirror 21, but needs to position the central mirror plate 13 for rearview purposes, the driver may exercise larger movements with a larger force. In this case, the second support arm member 53 pushes onto the first support arm member 52, exhausting its movement range around the sensor pivot point 32 and forcing the central mirror body 14 to rotate around the central mirror pivot point 19, thus allowing the central mirror plate 13 to be positioned.

[0031] While the above description includes a number of exemplary embodiments, it should be apparent to those skilled in the art that changes and modifications can be made to these embodiments without departing from the present invention, the scope of which is defined in the appended claims.

CLAIMS

1. Mirror positioning apparatus, comprising:

a) a support arm rigidly attachable to an interior surface of a vehicle;

b) a central mirror coupled to the support arm for pivotal movement about a sensor pivot point, the central mirror having a reflective front surface;

c) at least one sensor for sensing pivotal movements of the central mirror about the sensor pivot point and generating sensor output signals indicative of the pivotal movements;

d) at least one side mirror disposed on an exterior side of the vehicle;

e) a selection mechanism for selecting one or none of the at least one side mirror to be positioned and for generating a selection signal indicative of a selected side mirror;

f) a computer processor electronically coupled to the sensor and the selection mechanism, the computer processor being configured for receiving the selection signal and the sensor output signals and for generating side mirror position signals based on the sensor output signals; and

g) a side mirror motor operatively coupled to each of the at least one side mirror for receiving the side mirror position signals and positioning the selected side mirror in accordance therewith.

2. The apparatus defined in claim 1, wherein the central mirror comprises a central mirror body pivotally coupled to the support arm for pivotal movement about the sensor pivot point, and a central mirror plate rigidly attached to the central mirror body, the central mirror plate having the reflective front surface, and wherein the at least one sensor senses pivotal movement of the central mirror body about the sensor pivot point.

3. The apparatus defined in claim 2, wherein the at least one sensor comprises a rotation and elevation sensor mounted on the central mirror body, the rotation and elevation sensor comprising a lever arm extending away from the central mirror body, and a link arm linking the lever arm to the support arm, wherein the lever arm moves as the central mirror body is pivoted by the driver, thereby activating the rotation and elevation sensor.

4. The apparatus defined in claim 4, wherein the rotation and elevation sensor comprise at least one linear potentiometer.

5. The apparatus defined in claim 4, wherein the sensor output signals are indicative of changes in rotation and elevation of the central mirror body, the computer processor is configured to map the changes in rotation and elevation of the central mirror body into changes in rotation and elevation of the selected side mirror, and the position signals are indicative of the changes in rotation and elevation of the selected side mirror.

6. The apparatus defined in claim 1, wherein the at least one side mirror comprises side mirrors extending from opposite sides of the vehicle.

7. The apparatus defined in claim 1, wherein the central mirror comprises a central mirror body pivotally coupled to the support arm for pivotal movement about a central mirror pivot point, and a central mirror plate pivotally coupled to the central mirror body for pivotal movement about the sensor pivot point, the central mirror plate having the reflective front surface, and wherein the at least one sensor senses pivotal movement of the central mirror plate about the sensor pivot point.

8. The apparatus defined in claim 7, wherein the at least one sensor comprises at least two sensor switches embedded in the central mirror body, the sensor switches being spaced from each other, the sensor switches having actuators extending outwardly from a front surface of the central mirror body towards a rear surface of the central mirror plate, such that when the central

mirror plate is pivoted about the sensor pivot point by the driver, the rear surface of the central mirror plate bears against one or more of the actuators thereby activating the sensor switches and generating the sensor output signals, whereby the driver can use the central mirror plate as a joystick to position the selected side mirror.

9. The apparatus defined in claim 8, wherein each of the sensors also comprises a sensor spring extending between the rear surface of the central mirror plate and the front surface of the central mirror body, the sensor springs being configured so as to bias the central mirror plate away from the actuators when the driver does not put any pressure on the central mirror plate.

10. The apparatus defined in claim 9, wherein the sensors comprise four sensor switches, wherein each of the sensor switches is located adjacent a corner of the central mirror body.

11. The apparatus defined in claim 1, wherein the central mirror comprises a central mirror pivot member pivotally coupled to the support arm for movement about a central mirror pivot point, a central mirror body pivotally coupled to the central mirror pivot member for pivotal movement about a sensor pivot point, and a central mirror plate rigidly attached to a front surface of the central mirror body, the central mirror plate having the reflective surface, and wherein the at least one sensor senses pivotal movement of the central mirror body relative to the mirror body pivot member about the sensor pivot point.

12. The apparatus defined in claim 11, wherein the at least one sensor comprises sensor switches and sensor springs extending between the central mirror pivot member and the central mirror body, the sensor springs being configured so as to bias the central mirror body away from the sensor switches such that the sensor switches are not activated when no pressure is placed on the central mirror body by the driver, and such that slight movement of the central mirror body by the driver causes the pivotal movements of the central mirror body

about the sensor pivot point, thereby activating one or more of the sensor switches.

13. The apparatus defined in claim 12, wherein the sensor springs are configured such that stronger movement of the central mirror body by the driver causes the central mirror body to push against the central mirror pivot member and cause the central mirror pivot member to pivot about the central mirror pivot point.

14. The apparatus defined in claim 1, wherein the support arm comprises a first support arm member rigidly attachable to an interior portion of a vehicle, and a second support arm member pivotally coupled to the first support arm member for pivotally movement about the sensor pivot point, wherein the central mirror comprises a central mirror body pivotally coupled to the second support arm member for pivotal movement about a central mirror pivot point, and a central mirror plate rigidly attached to the central mirror body, the central mirror plate having the reflective front surface, and wherein the at least one sensor senses pivotal movement of the second support arm member relative to the first support arm member about the sensor pivot point.

15. The apparatus defined in claim 14, wherein the at least one sensor comprises sensor switches and sensor springs extending between the first support arm member and the second support arm member, the sensor springs being configured to bias the second support arm member away from the sensor switches, such that the sensor switches are not activated when the second support arm member is in a rest position, and such that slight movement of the central mirror body by the driver causes pivotal movement of the second support arm member about the sensor pivot point, thereby activating one or more of the sensor switches.

16. The apparatus defined in claim 15, wherein the sensor springs are configured such that stronger movement of the central mirror body by the driver

causes the second support arm member to push against the first support arm member and the central mirror body to pivot about the central mirror pivot point.

17. Apparatus for positioning side mirrors of a vehicle, comprising:

a) a support arm rigidly attachable to an interior surface of a vehicle;

b) a central mirror body pivotally attached to the support arm for movement about a central mirror pivot point, and a central mirror plate pivotally attached to the central mirror body for movement about a sensor pivot point, the central mirror plate having a reflective front surface;

c) sensors extending between the central mirror body and the central mirror plate for sensing pivotal movements of the central mirror plate about the sensor pivot axis and for generating output signals indicative of the pivotal movement;

d) side mirrors extending from opposite exterior sides of the vehicle, each of the side mirrors comprising a side mirror housing, and a side mirror plate having a reflective front surface;

e) a selection mechanism mounted on the central mirror body for selecting one or none of the side mirrors to be positioned and for generating a selection signal indicative of a selected side mirror;

f) a computer processor for receiving the selection signal and the sensor output signals and for generating side mirror position signals for positioning the selected side mirror based upon the sensor output signals; and

g) side mirror motors mounted within the side mirror housing for receiving the side mirror position signals and moving the side mirrors in accordance therein, wherein movement of the central mirror plate by the driver repositions the selected side mirror.

18. The apparatus defined in claim 17, wherein the sensors comprise at least two sensor switches, the sensor switches having actuators extending outwardly from a front surface of the central mirror body towards a rear surface of the

central mirror plate, the sensor switches being positioned adjacent opposite edges of the front surface, such that when the central mirror plate is pivoted about the sensor pivot point by the driver, the central mirror plate bears against one or more of the actuators thereby activating the sensor switches and generating the sensor output signals, thereby allowing the driver to use the central mirror plate as a joystick to position the selected side mirror.

19. Apparatus for positioning the side mirrors of a vehicle, comprising:

a) a support arm rigidly attachable to an inside surface of a vehicle;

b) a central mirror pivot member pivotally coupled to the support arm for movement about a central mirror pivot point, a central mirror body pivotally coupled to the mirror body pivot member for pivot movement about a sensor pivot point, and a central mirror plate rigidly attached to a front surface of the central mirror body, the central mirror plate having a reflective surface;

c) sensors for sensing pivotal movement of the central mirror body relative to the central mirror pivot member about the sensor pivot axis, the sensors comprising sensor switches and sensor springs extending between the central mirror pivot member and the central mirror body;

d) side mirrors extending from opposite exterior sides of the vehicle, each of the side mirrors comprising a side mirror housing, and a side mirror plate having a reflective front surface;

e) a selection mechanism mounted on the central mirror body for selecting one or none of the side mirrors to be positioned and for generating a selection signal indicative of a selected mirror to be positioned;

f) a computer processor for receiving the selection signal and the sensor output signals and for generating position signals for positioning the selected side mirror based upon the sensor output signals; and

g) side mirror motors mounted within the side mirror housing for receiving the position signals and moving the side mirrors in accordance

therein, wherein movement of the central mirror body by the driver repositions the selected side mirror.

20. The apparatus defined in claim 19, wherein the sensor springs are configured so as to bias the central mirror body away from the sensor switches, such that slight movement of the central mirror body by the driver causes the central mirror to pivot about the sensor pivot point relative to the central mirror pivot member, thereby activating one or more of the sensor switches, and such that stronger movement of the central mirror body by the driver causes the central mirror body to push against the mirror body pivot member and the mirror body pivot member to pivot about the central mirror pivot point.

21. Apparatus for adjusting the side mirrors of a vehicle, comprising:

a) a support arm comprising a first support arm member rigidly attachable to an interior portion of a vehicle, and a second support arm member pivotally coupled to the first support arm member for pivotally movement about a sensor pivot axis;

b) a central mirror body pivotally coupled to the second support arm member for pivotal movement about a central mirror axis, and a central mirror plate rigidly attached to the central mirror body, the central mirror plate having a reflective front surface;

c) sensors for sensing pivotal movement of the second support arm member relative to the first support arm member about the sensor pivot axis;

d) side mirrors extending from opposite exterior sides of the vehicle, each of the side mirrors comprising a side mirror housing, and a side mirror plate having a reflective front surface;

e) a selection mechanism for selecting a side mirror to be positioned and for generating a selection signal indicative of a selected mirror to be positioned;

f) a computer processor for receiving the selection signal and the sensor output signals and for generating position signals for positioning the selected side mirror based upon the sensor output signals; and

g) side mirror motors for mounted within the housing for receiving the position signals and moving the side mirrors in accordance therein, wherein movement of the central mirror plate by the driver repositions the selected side mirror.

22. The apparatus defined in claim 21, wherein the sensors comprise sensor switches and sensor springs extending between the first support arm member and the second support arm member, the sensor springs being configured so as to bias the second support arm member away from the sensor switches, such that slight movement of the central mirror body by the driver causes pivotal movement of the second support arm member about the sensor pivot axis, thereby activating one or more of the sensor switches, and such that stronger movement of the central mirror body by the driver causes the second support arm member to push against the first support arm member and the central mirror body to pivot about the central mirror pivot point.

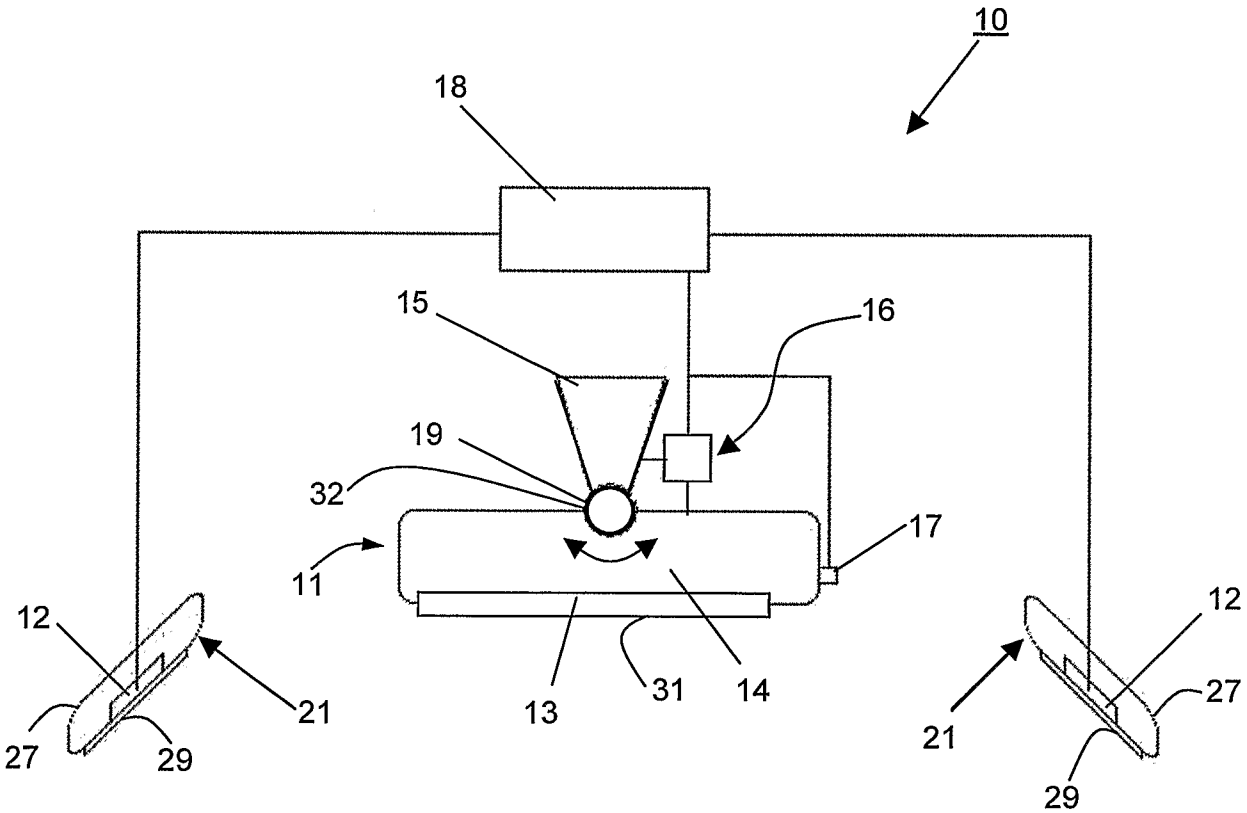

FIG. 1

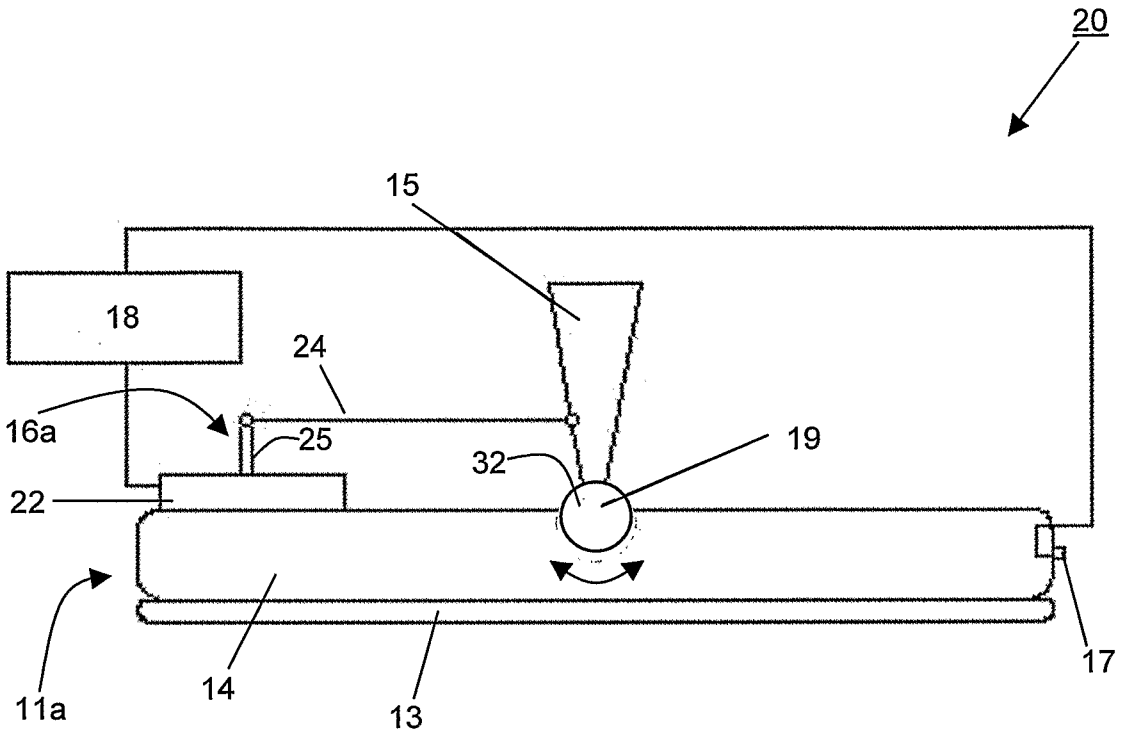

FIG. 2

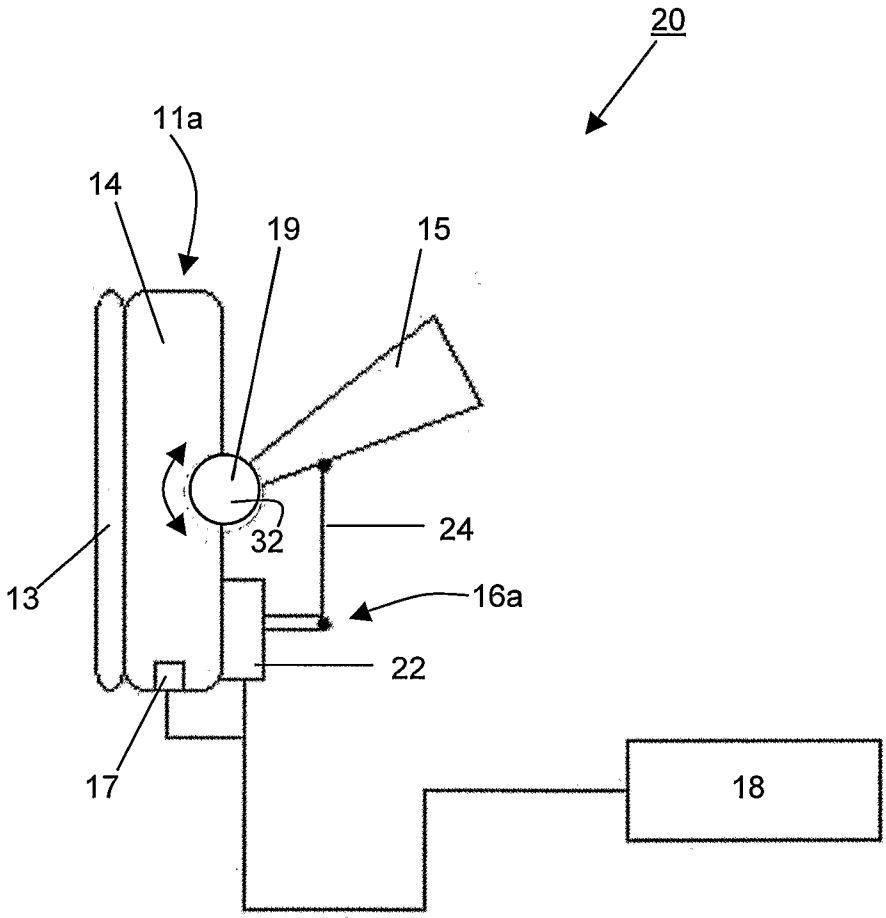

FIG. 3

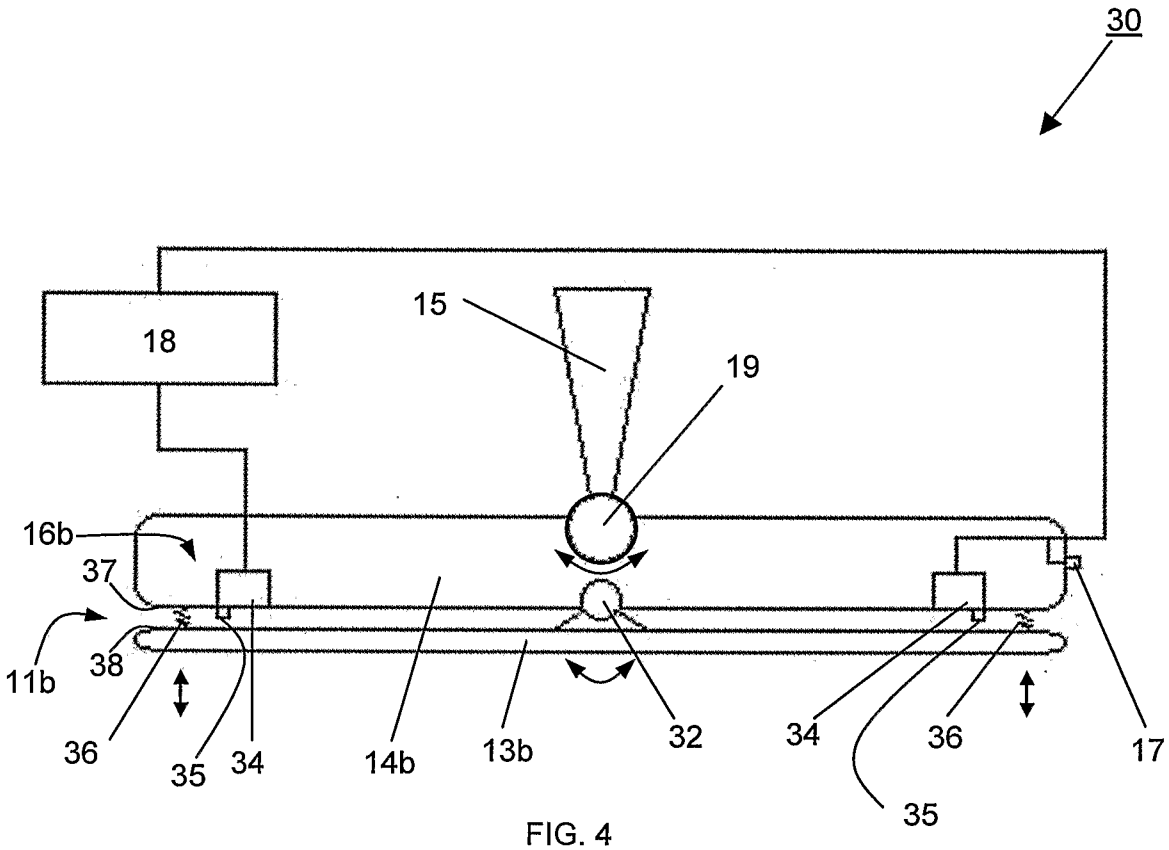

FIG. 4

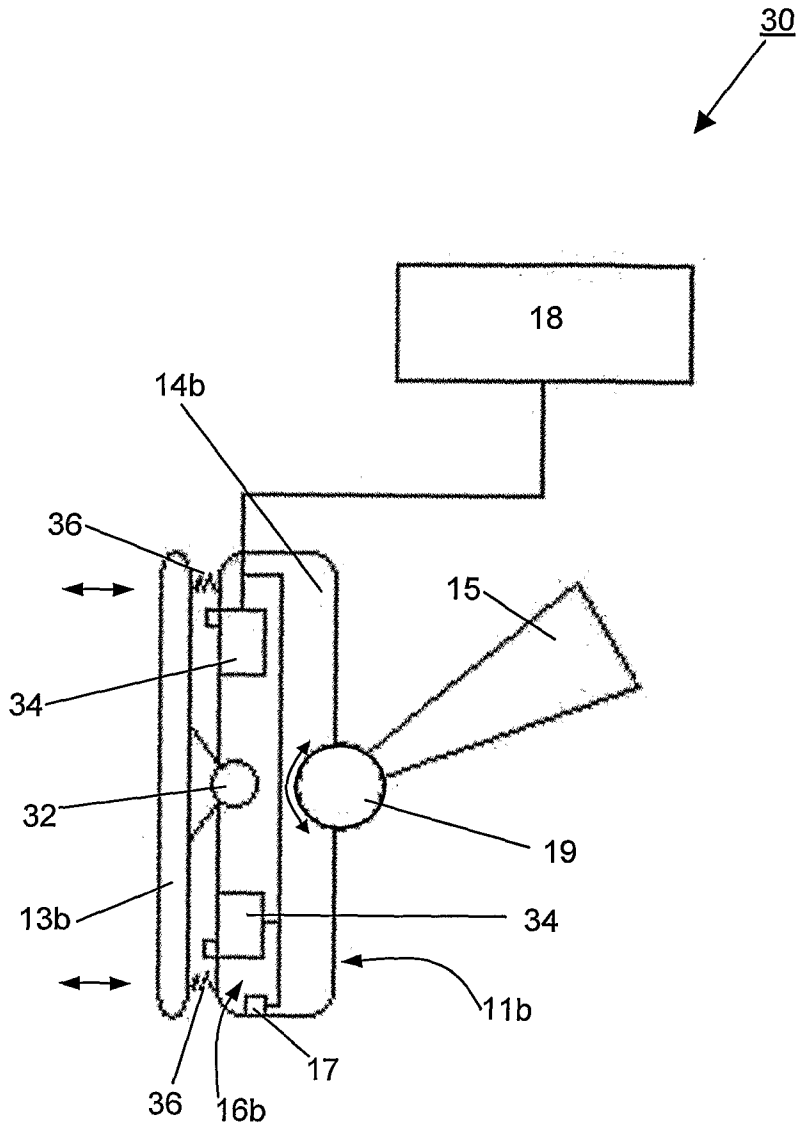

FIG. 5

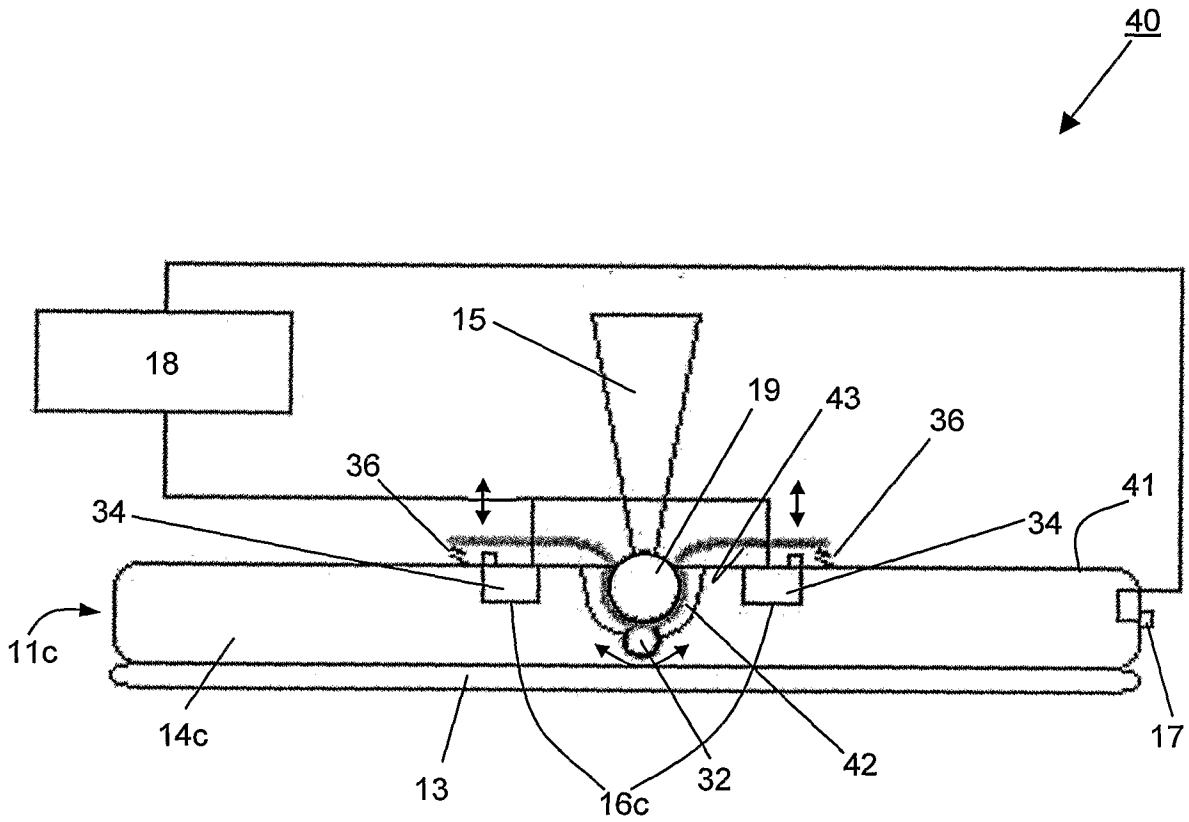

FIG. 6

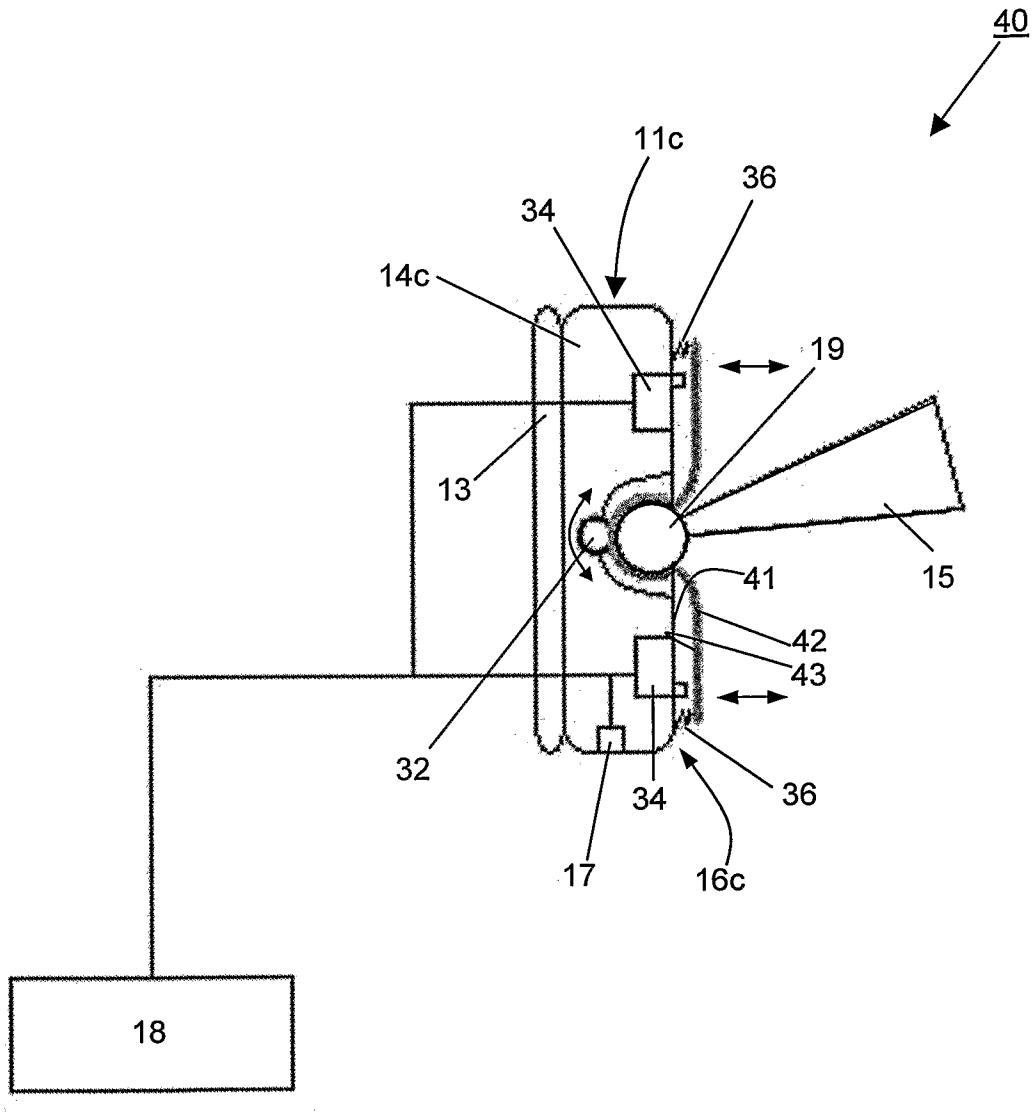

FIG. 7

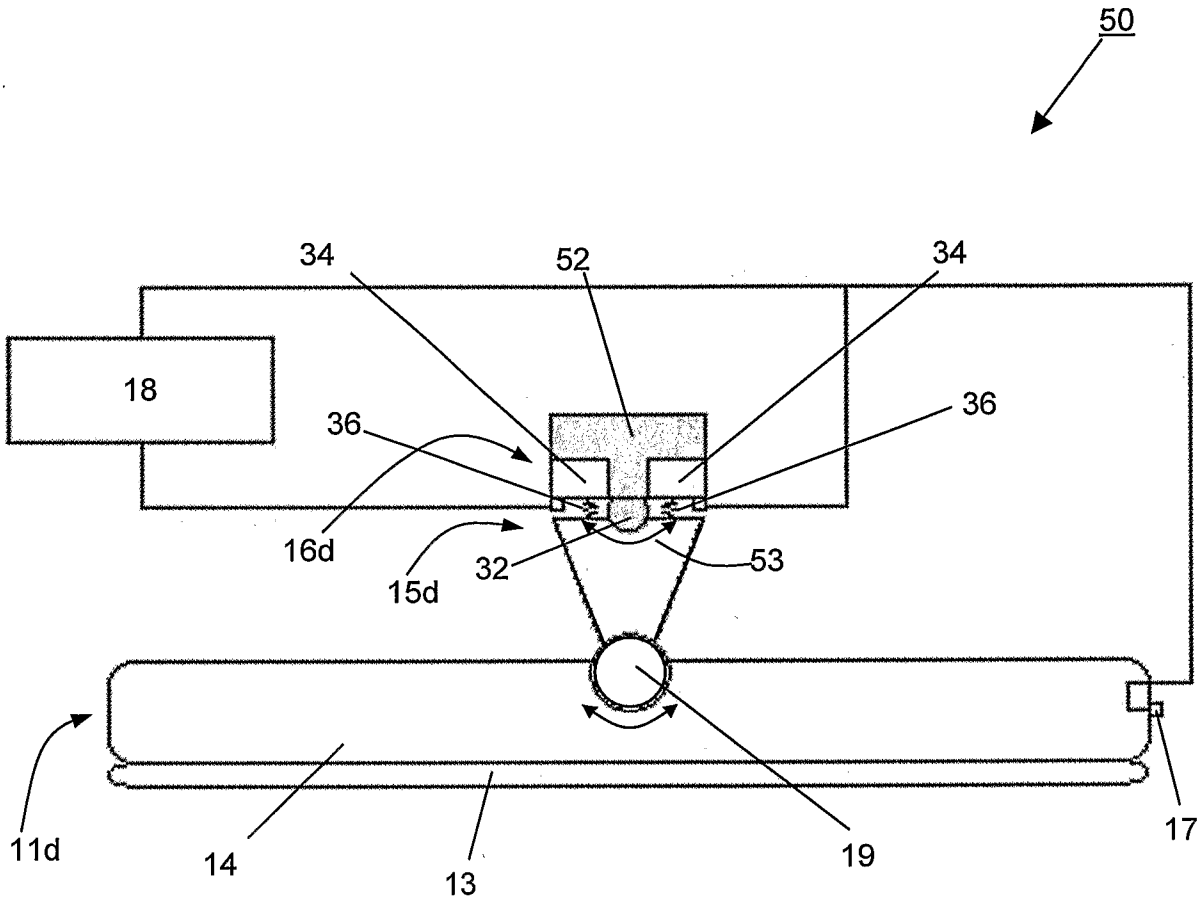

FIG. 8

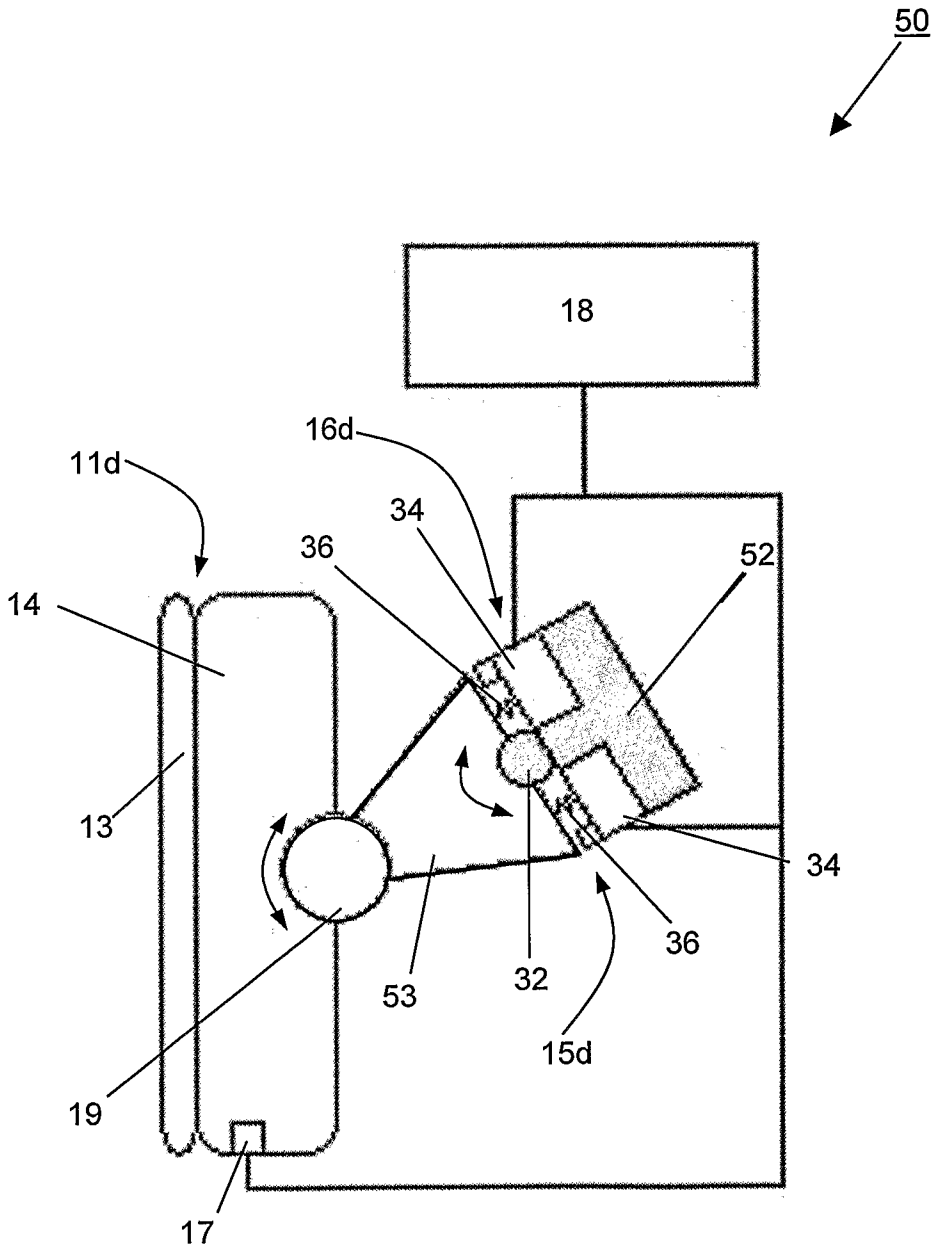

FIG. 9