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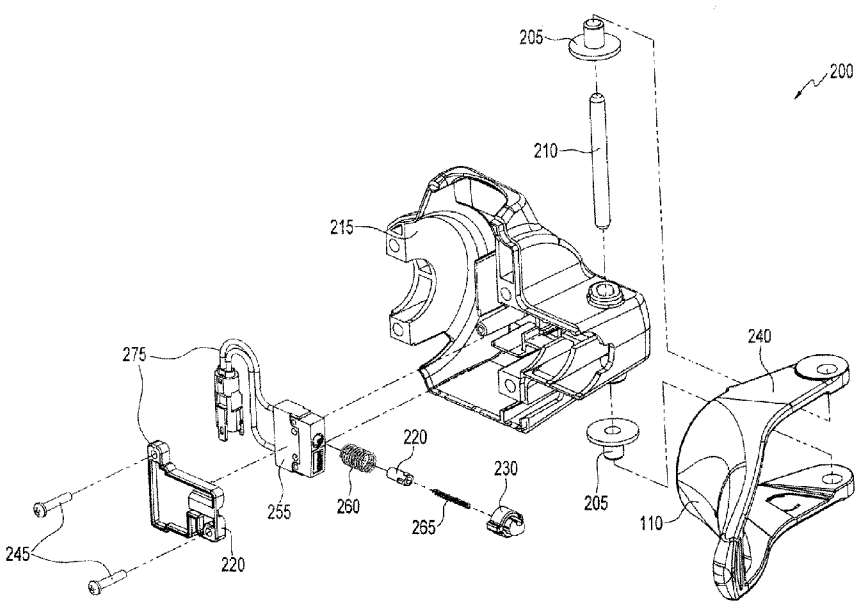
(54) **Title:** THROTTLE CONTROL APPARATUS FOR A SNOWMOBILE




(57) **Abstract:** A snowmobile throttle control apparatus includes a pair of bushings (205) with a hole and closed ends and a separate axle pin (210). The bushings (205) are assembled to a thumb lever (110) and mounted over the axle pin (210). The axle pin (210) allows for a controlled gap to be maintained between the throttle lever (110), bushing assembly and the control housing. The thumb lever (110) is allowed to flex open when a side load is applied. Thus allowing the thumb lever assembly to travel without binding on the control housing. This insures proper functioning of a run away prevention switch.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# SNOWMOBILE THROTTLE CONTROL TOP HAT DESIGN

## TECHNICAL FIELD

**[0001]** Embodiments are generally related to the field of throttle controls for recreational vehicles such as snowmobiles. Embodiments are also related to snowmobile throttle control levers.

## BACKGROUND OF THE INVENTION

**[0002]** Many different types of recreational vehicles have been developed and are used by sports enthusiasts. Recreational vehicles include, for example, vehicles such as boats, airplanes, gliders, motorcycles, ATVs (all-terrain vehicles), snowmobiles and the like. Different environments are used for different recreational vehicles. Specifically, in water environments, recreational vehicles are boats or jet skis; in air environments the recreational vehicles are hang gliders or airplanes; in sand the recreational vehicles are dune buggies or ATVs; and in snow environments the recreational vehicle of choice is usually a snowmobile.

**[0003]** At least since the early 1960's snowmobiles have been used by sports enthusiasts in winter environments. Snowmobiles can travel on snow by the use of two front skis and a track somewhat similar to a tank track, which runs from the back of the skis to the back of the snowmobile. The track is used to propel the snowmobile forward in the snow and the skis are used to change the direction of the snowmobile. Traditionally, snowmobiles have utilized a handlebar type steering mechanism instead of a steering wheel type steering mechanism. Usually on the snowmobile driver's righthand side when he or she is seated in the snowmobile seat is the throttle and on the left hand side is the brake. The right hand side of the handlebar usually includes a handle grip adapted for engagement with the glove of the snowmobiler and a throttle, which is adapted to be depressed to accelerate the snowmobile. The thumb of the driver's right hand engages the throttle. The left hand side of the handlebar can likewise include a brake that extends parallel to the handlebar grip directly opposite to the snowmobile.

**[0004]** The natural tendency of snowmobile throttle control levers is for the legs to

warp together. When this happens the lever squeezes the control housing, thereby preventing the throttle lever from moving freely. The throttle lever attaches to an axle pin, which actuates an RPS (Runaway Prevention Switch). When the thumb lever is unable to move freely, the RPS switch will not function properly. The thumb lever must also possess the ability to spread so that the legs do not bind, thereby ensuring proper RPS function when the operator provides side-load to the throttle lever.

**[0005]** Based on the foregoing it can be appreciated that when the operator of snowmobile provides a side load to a throttle lever, the throttle lever does not move freely and hence the RPS does not function properly. It is believed that a solution to this problem involves the implementation of a pair of bushings with a hole and closed ends placed on either side of axle pin for maintaining controlled gap between throttle and bushing assembly, which is disclosed in greater detail. This ensures proper functioning of the RPS when the operator provides side-load to the throttle lever.

## BRIEF SUMMARY

**[0006]** The following summary is provided to facilitate an understanding of some of the innovative features unique to the embodiments disclosed and is not intended to be a full description. A full appreciation of the various aspects of the embodiments can be gained by taking the entire specification, claims, drawings, and abstract as a whole.

**[0007]** It is, therefore, one aspect of the present invention to provide for improved throttle controls for recreational vehicles such as snowmobiles.

**[0008]** It is another aspect of the present invention to provide an improved structure for throttle control levers.

**[0009]** The aforementioned aspects and other objectives and advantages can now be achieved as described herein. A snowmobile throttle control apparatus is disclosed, which includes the use of two bushings a hole, one or more closed ends and a separate axle pin. The bushings are assembled to a thumb lever and mounted over the axle pin. The axle pin allows for a controlled gap to be maintained between the throttle lever, bushing assembly and the control housing. Additionally, the thumb lever is allowed to flex open when a side load is applied. Thus allowing the thumb lever assembly to travel without binding on the control housing. This insures proper functioning of the RPS feature.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0010]** The accompanying figures, in which like reference numerals refer to identical or functionally-similar elements throughout the separate views and which are incorporated in and form a part of the specification, further illustrate the embodiments and, together with the detailed description, serve to explain the embodiments disclosed herein.

**[0011]** FIG. 1 illustrates a perspective view of a snowmobile, which can be implemented in accordance with a preferred embodiment;

**[0012]** FIG. 2 illustrates an exploded view of throttle control of snowmobile, which can be implemented in accordance with a preferred embodiment;

**[0013]** FIG. 3 illustrates a perspective view of a throttle control of snowmobile, in accordance with a preferred embodiment;

**[0014]** FIG. 4 illustrates a sectional view of a throttle control of snowmobile taken along line 3-3 of FIG.3, in accordance with a preferred embodiment; and

**[0015]** FIG. 5A illustrates a perspective view of a throttle control mechanism for a snowmobile; and

**[0016]** FIG. 5B illustrates a sectional view of a throttle control mechanism of snowmobile taken along line A-A of FIG.5A, in accordance with a preferred embodiment.

## DETAILED DESCRIPTION

**[0017]** The particular values and configurations discussed in these non-limiting examples can be varied and are cited merely to illustrate at least one embodiment and are not intended to limit the scope thereof.

**[0018]** Referring to FIG. 1, a perspective view of a snowmobile 100 is illustrated, which can be implemented in accordance with a preferred embodiment. The snowmobile 100 generally includes a frame 120 having a pair of skiis 125 coupled to the forward portion. The RPM of the engine of snowmobile 100 can be selectively adjusted utilizing a throttle lever 110 mounted on a right handle bar 115 of snowmobile 100. A hand grip 105 is generally attached to a right handle bar 115 of snowmobile 100.

**[0019]** Referring to FIG. 2 an exploded view of a throttle control mechanism 200 of a snowmobile, such as snowmobile 100 depicted in FIG. 1, can be implemented in accordance with a preferred embodiment. Note that in FIGS. 1-2, identical or similar parts or elements are generally indicated by identical reference numerals. For example, the throttle lever 110 depicted in FIG. 1 also appears in FIG. 2. As depicted in FIG. 2, a Runaway Prevention Switch (RPS) 275 can be provided, which includes a pair of screws 245, a cover 220, a connector assembly 255 containing a micro-switch, an external spring 260, an internal spring 265, a small plunger 225 and a large plunger 230. The RPS 275, throttle lever 110, an axle pin 210 and a pair of bushing 205 are housed into a control housing or case 215. The bushings 205 can be assembled to a pair of legs 240 in the throttle lever 110 and mounted over the axle pin 210. The axle pin 210 maintains a controlled gap between the throttle lever 110 and control housing 215.

**[0020]** Referring now to FIG. 3, a perspective view of a throttle control mechanism 300 for a snowmobile 100 is illustrated, which can be implemented in accordance with a preferred embodiment. The configuration depicted in FIG. 3 is essentially an imploded view of the configuration illustrated in FIG. 2. Note that in FIGS. 1-4, identical or similar parts or elements are indicated by identical reference numerals. Thus, the FIG. 3 illustration also depicts the control housing 215, throttle lever 110, a pair of legs 240, an axle pin 210 and a bushing 205, which are described above with respect to FIG. 2.

**[0021]** Referring to FIG. 4, a sectional view of a throttle control mechanism 400 of snowmobile 100 is illustrated taken along section line A-A of FIG. 3, in accordance with a preferred embodiment. The configuration depicted in FIG. 4 illustrates the control housing 215, throttle lever 110, a pair of legs 240, an axle pin 210 a RPS 275 and a bushing 205 as depicted previously with respect to in FIG. 2.

**[0022]** Referring to FIG. 5A-5B, FIG. 5A illustrates a perspective view of a throttle control mechanism 502 of snowmobile 100, and FIG. 5B depicts a sectional view of a throttle control mechanism 504 of snowmobile 100 taken along line A-A of FIG. 5A, in accordance with a preferred embodiment. With reference to the perspective view of the throttle control mechanism 502, the cross sectional view of throttle control mechanism 504 is shown along the lines A-A. Note that in FIGS. 1-5A/5B identical or similar parts or elements are generally indicated by identical reference numerals. Thus, the FIG. 5B illustration also depicts the control housing 215, throttle lever 110, an axle pin 210 and a bushing 205 which are described above with respect to FIG. 2.

**[0023]** It will be appreciated that variations of the above-disclosed and other features and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Also that various presently unforeseen or unanticipated alternatives, modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

CLAIMS

What is claimed is:

1. A snowmobile throttle control apparatus, comprising:

a throttle lever comprising a pair of holes;

a case comprising a hole for inserting an axle pin through said pair of holes of said throttle lever;

an insulation member placed on either side of the said axle pin; and

a runaway prevention switch housed inside said case, thereby permitting said throttle level to actuate said runaway prevention switch utilizing said axle pin and ensure proper functioning of said snowmobile throttle control apparatus.

2. The apparatus of claim 1 wherein said insulation member comprises a closed end and an open end.

3. The apparatus of claim 1 wherein said insulation member comprises at least one bushing.

4. The apparatus of claim 3 wherein said axle pin floats within said at least one bushing, thereby permitting said axle pin to travel without binding to said case.

5. The method of claim 4 wherein said at least on bushing comprises an injection molded plastic.

6. A snowmobile throttle control apparatus, comprising:

a throttle lever comprising a pair of holes;

a case comprising a hole for inserting an axle pin through said pair of holes of said throttle lever;

an insulation member placed on either side of the said axle pin, wherein said insulation member comprises at least one bushing, a closed end and an open end; and

a runaway prevention switch housed inside said case, thereby permitting said throttle level to actuate said runaway prevention switch utilizing said axle pin and ensure proper functioning of said snowmobile throttle control apparatus.

7. The apparatus of claim 6 wherein said axle pin floats within said at least one bushing, thereby permitting said axle pin to travel without binding to said case.

8. A method of configuring a snowmobile throttle control apparatus, for use with a snowmobile, comprising:

providing a throttle lever comprising a pair of holes;

configuring a case to comprise a hole for inserting an axle pin through said pair of holes of said throttle lever;

placing an insulation member on either side of the said axle pin; and

housing a runaway prevention switch inside said case, thereby permitting said throttle level to actuate said runaway prevention switch utilizing said axle pin and ensure proper functioning of said snowmobile throttle control apparatus.

9. The method of claim 8 further comprising configuring said insulation member to comprise a closed end and an open end.

10. The method of claim 8 further comprising configuring said insulation member to include at least one bushing.

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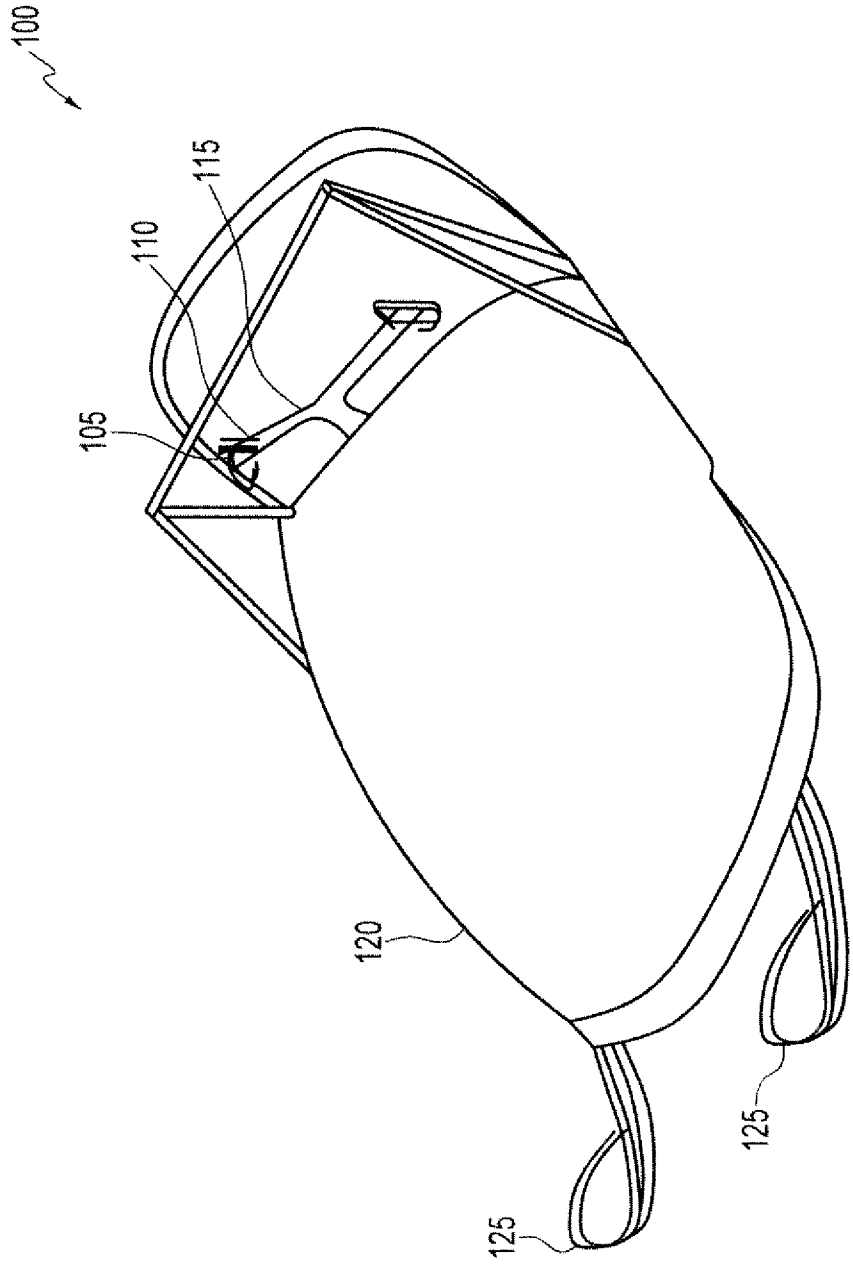


FIG. 1

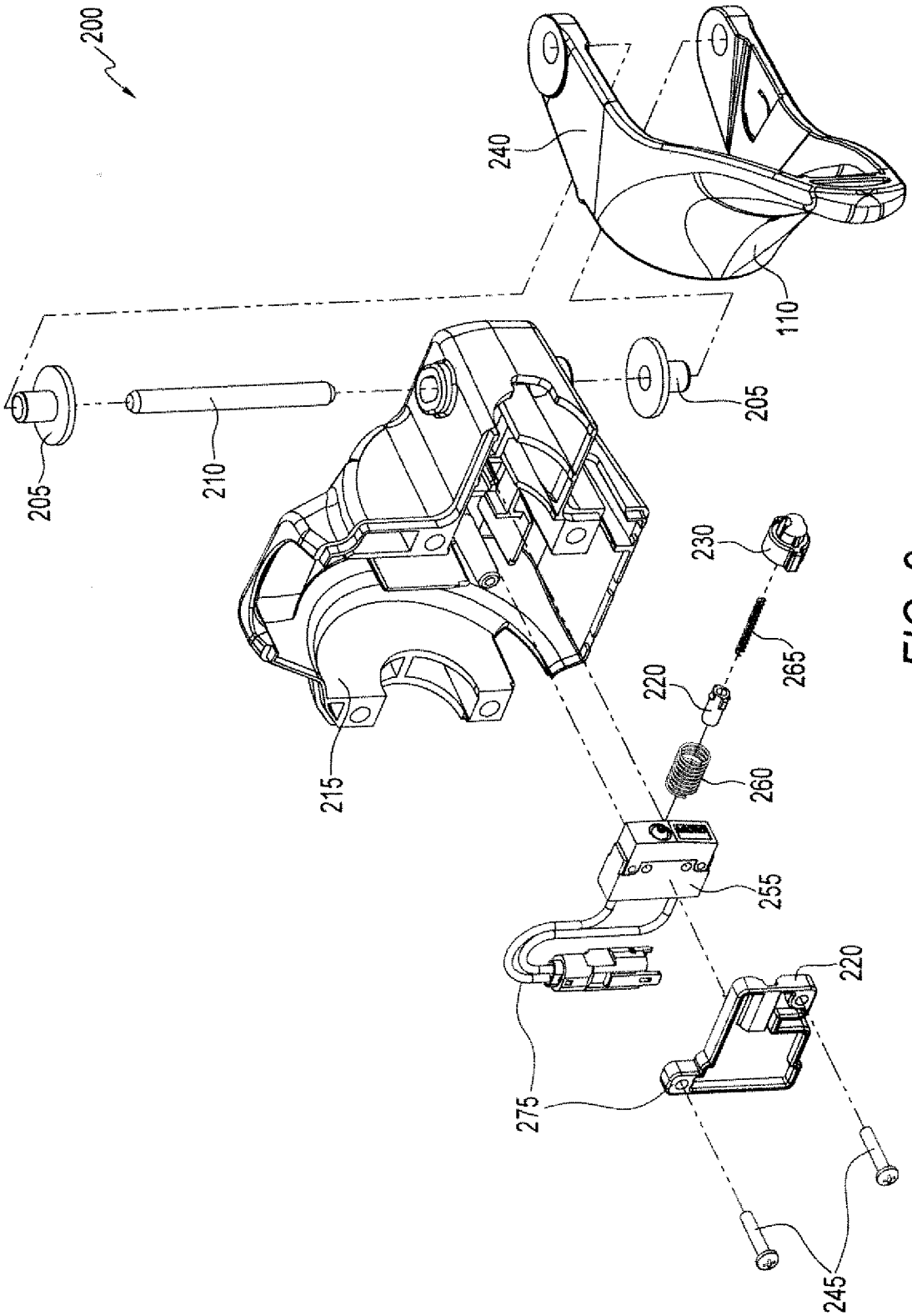


FIG. 2

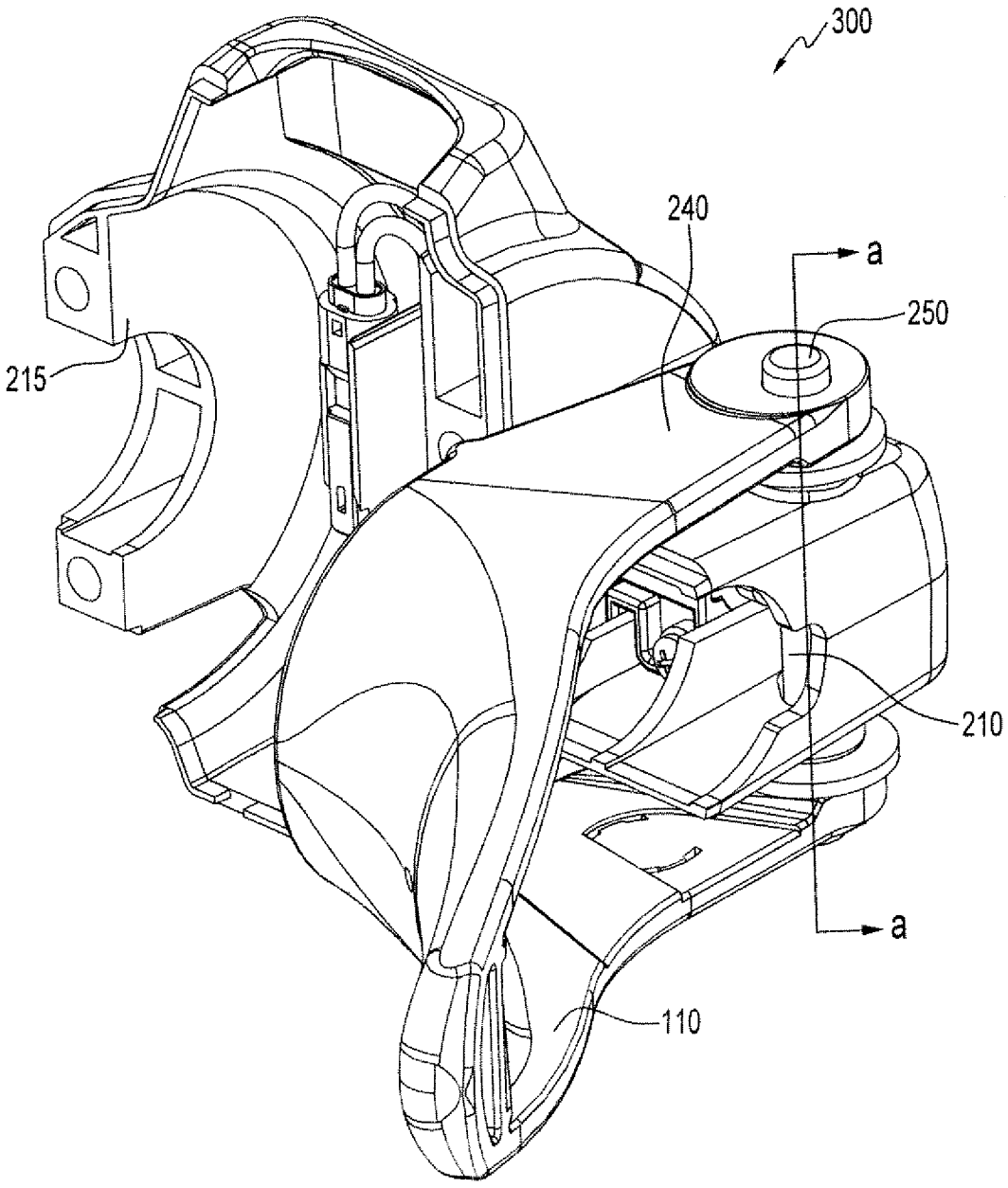


FIG. 3

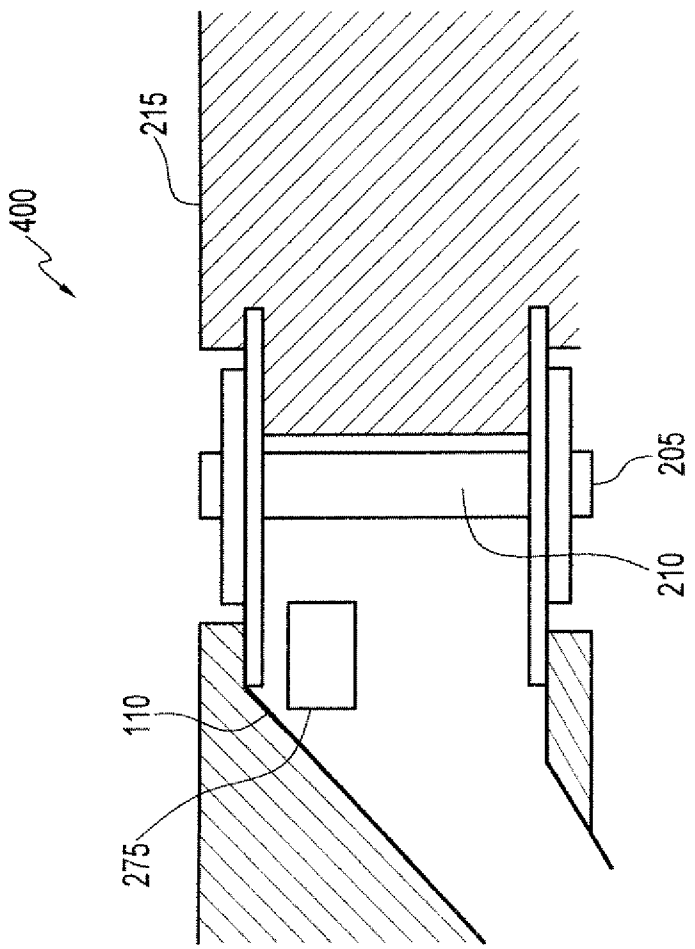


FIG. 4

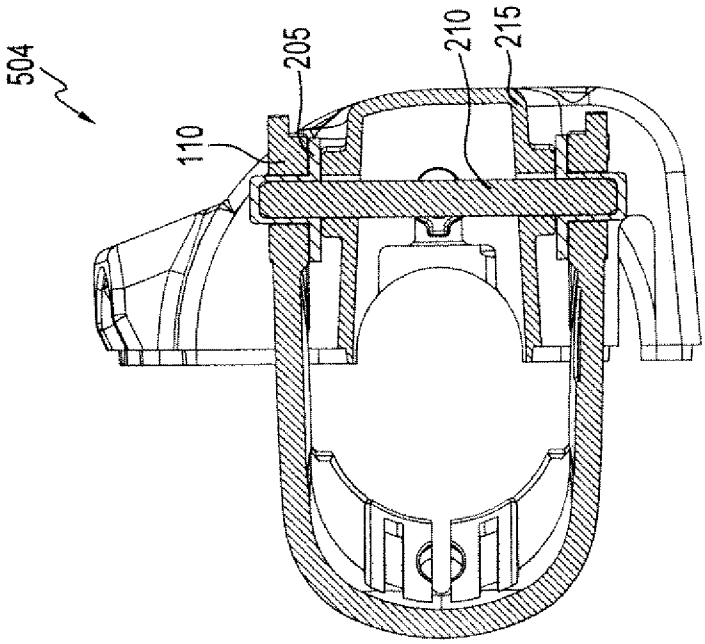


FIG. 5B

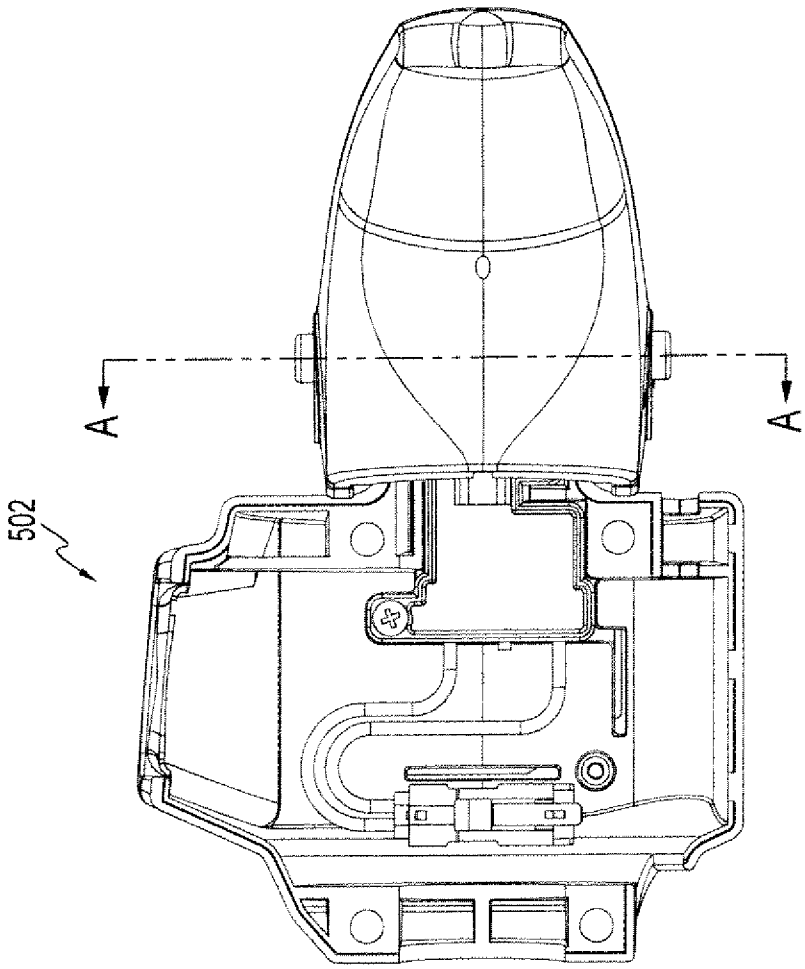


FIG. 5A

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/068769

A. CLASSIFICATION OF SUBJECT MATTER
INV. B62K11/14 B62K23/06
ADD. B60K28/00 G05G11/00 F02D11/02 B62M27/02

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)
B60K B62K B62M G05G

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 practical, 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. |
|---|---|---|
| X | US 4 213 513 A (BECK FREDERICK R [US])<br>22 July 1980 (1980-07-22)<br>column 4, line 56 - column 9, line 42;<br>figures 1-19 | 1-10 |
| X | US 4 237 997 A (SWANSON LARRY D [US])<br>9 December 1980 (1980-12-09)<br>column 2, line 4 - column 4, line 35;<br>figures 1-4 | 1-10 |
| X | US 3 694 596 A (CARLSON JOHN A)<br>26 September 1972 (1972-09-26)<br>column 2, line 58 - column 5, line 34;<br>figures 1-6 | 1-10 |
| A | US 4 899 610 A (BOURRET MICHEL [CA])<br>13 February 1990 (1990-02-13)<br>column 2, line 33 - column 4, line 17;<br>figures 1-5 | 1-10 |

[ ] 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 document 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

"P" document published prior to the international filing date but later than the priority date claimed

"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

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 11 October 2007 | 18/10/2007 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040, Tx. 31 651 epo nl,<br>Fax: (+31–70) 340–3016 | Flori, Massimiliano |

Form PCT/ISA/210 (second sheet) (April 2005)

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/068769

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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