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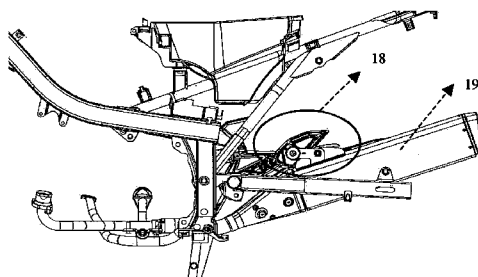


Fig.4

(57) Abstract: The present invention relates to pillion footrest assembly to provide a vibration damping mechanism to reduce the vibration at the pillion footrest of a two-wheeler. The assembly consists of footrest mounting bracket, a damper mechanism, and a pillion foot peg assembly wherein the pillion footrest is isolated from undesirable vibration by dampening means.



WO 2011/001444 A2

## **VIBRATION-DAMPENING ASSEMBLY**

### **5 FIELD OF INVENTION**

The present invention relates to pillion footrest assembly for motor vehicles, more particularly relates to providing a vibration damper assembly with a Pillion footrest assembly of a two-wheeled vehicle.

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### **BACKGROUND OF THE INVENTION**

In a two-wheeler, footrests are provided on both sides of a frame structure for driver and pillion rider. Apart from safe positioning of the feet, the footrest aids the driver in shifting  
15 the gears and also in applying the brakes. A pillion footrest assembly is provided for supporting the feet of the pillion rider. In conventional two-wheelers, the pillion footrest assembly includes a pillion footrest bracket and a pillion foot peg assembly. The pillion foot peg assembly consisting of a holder pillion foot peg, pillion foot peg and sleeve.

20 Generally, the pillion footrest bracket is an overhanging member with one end supported onto the swing arm assembly mounting position on the frame structure, to enhance the strength of attachment; the pillion footrest bracket is further attached at a lower mounting position on the frame structure and another end holds the pillion foot peg assembly. This is provided on either side of the motorcycle. The position of the pillion foot peg assembly  
25 mostly depends upon the position of the pillion rider on the rear part of the seat of the motorcycle. Hence depending upon the vehicle layout, the position of pillion foot peg assembly may vary. The overhanging member of the pillion footrest bracket leads to extreme transfer of vibration to the pillion foot peg assembly during motorcycle operation, which usually results in pillion rider discomfort. Further, these vibrations can  
30 also cause damage to the two-wheeler in case the frequency of these vibrations matches with the natural frequency of the frame structure resulting in the phenomena of resonance. Resonance substantially increases vibrations in the frame structure and hence

can lead to failure of various mechanical parts of the two-wheeler.

Therefore, the challenge is to minimize the unwanted vibrations in a pillion footrest assembly.

## 5 SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a vibration damping mechanism to reduce the vibration at the pillion footrest of a two-wheeler.

- 10 Another objective of the present invention is to provide a dissimilar vibration damping means for the pillion footrest assembly provide on either side of the vehicle.

## BRIEF DESCRIPTION OF DRAWINGS

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Fig. 1 illustrates a left side view of a motorcycle;

Fig. 2 illustrates a left side view showing frame structure with pillion footrest assembly, swing arm assembly excluding engine and other related parts;

- 20 Fig. 3 illustrates a rear side view showing pillion footrest bracket, pillion foot peg assembly (isolated) and pillion foot peg assembly and related parts;

Fig. 4 illustrates a first sectional view showing damper assembly and external mass along lines A-A of Fig. 3;

Fig. 5 illustrates a Perspective view showing the mounting arrangement of the damper assembly;

- 25 Fig. 6 illustrates second sectional view showing pillion foot peg, holder pillion foot peg (Internal with pillion footrest bracket), sleeve, pin and mass-B along lines B-B in Fig. 3 of the Pillion foot peg assembly;

Fig. 7 illustrates a third sectional view showing holder pillion foot peg (Isolated from pillion footrest bracket) along lines C-C in Fig. 3 of the Pillion foot peg assembly; and

- 30 Fig. 8 illustrates a Perspective view of the Damper assembly.

## DETAILED DESCRIPTION OF THE INVENTION

Any known motorcycle, as illustrated in fig. 1, can be divided into three major portions, the front portion **F**, the middle portion **M** and the rear/tail portion **R**. The front portion **F** comprises of the steering, front wheel with necessary brakes **1**, front suspension **2**, fender **3**, and side cover **4**; the middle portion **M** comprises of the step through portion **5**, rider seat **6**, stand **7**, engine **8**, gear shift lever **9** etc; and the rear/tail portion **R** comprises of petrol tank **10**, swing arm assembly **11**, back wheel and rear suspension **12** and rear fender **13**.

This invention will now be described with reference to the embodiments in Figs. 2 to 8.

A pillion footrest assembly **15** of a two-wheeler includes a pillion footrest bracket **16** and pillion foot peg assembly **17**. The pillion footrest bracket **16** is extending longitudinally and substantially downwardly of the two-wheeler. The pillion foot peg assembly **17** is a short extending member from the pillion footrest bracket **16** for comfortable resting of the pillion's foot. The pillion footrest bracket **16** has a first side and a second side, wherein the second side is dorsal to the first side. The second side of the pillion footrest bracket **16** is secured rigidly to the frame structure **14** at a swing arm assembly **11** mounting position and at lower arm mounting position of the two-wheeler. The pillion foot peg assembly **17** is connected with the first side of the pillion footrest bracket **16**.

In the first embodiment as shown in Fig. 4, the challenge of eliminating the vibrations felt by a pillion rider when riding a two-wheeler is overcome by providing a damper assembly **18** dorsal to the first side of the pillion footrest bracket **16** more particularly along with an external overhanging mass **19**. The said external mass **19** may be a muffler assembly. The said external mass **19** is connected with the pillion footrest bracket **16** by using a screw-A **20** and a nut-A **21** arrangements. The damper assembly **18** as shown in Fig. 8 consists of a mass-A **24** and a bracket **27**, wherein the mass-A **24** is connected with the bracket **27** at an farthest position from its mounting point **26** by using a screw-B **28** and a nut-B **29** arrangement. The mass-A **24** is a metallic member, wherein the metallic

member is connected with the bracket 27 by either a fastening means or by welding or by providing mass-A 24 as an integral part in the bracket 27.

As the damper assembly 18 is secured at a predetermined position on a pillion footrest bracket 16 along with the external mass 19 such that the frequency of the damper assembly 18 matches with the excitation frequency thereby reducing the unwanted vibrations to the pillion footrest assembly 15. This substantially eliminates the vibrations caused by the overhang member of the pillion footrest bracket 16, thereby increasing the pillion ride comfort and safety. Even though the arrangement shown in the diagrams indicates fitment of muffler assembly on the right hand side of the vehicle, the embodiment is not restricted to only right hand side. In the event of the muffler assembly fitted on the both sides or on left hand side, same arrangement of the vibration damper is employed.

**In a second embodiment**, the pillion footrest assembly 15 as shown in Fig. 6 of a two-wheeled vehicle includes a pillion footrest bracket 16, a holder pillion foot peg 22, a pin 25 and a pillion foot peg assembly 17. The pin 25 hinges the pillion foot peg assembly 17 with the holder foot peg 22. Further the pillion foot peg assembly 17 includes a mass-B 31, sleeve 23, and pillion foot peg 30. The pillion foot peg assembly 17 is a short extending member from the pillion footrest bracket 16 for comfortable resting of the pillion's foot.

The mass-B 31 is a part of the pillion foot peg assembly 17 wherein one side of the mass-B 31 is connected with the pillion foot peg 30 such that the frequency of the pillion foot peg assembly 17 matches the excitation frequency thereby reducing the unwanted vibrations, thereby increasing the pillion ride comfort and safety. The pillion footpeg assembly 17 frequency is tuned to frequency of interest in which vibration reduction is sought. The mass-B 31 is a metallic member, wherein the metallic member is connected by means of fastening or welding or by providing mass-B 31 as an integral part in the pillion foot peg 30.

The sleeve 23 is a rubber part for securing the pillion foot peg 30. The sleeve 23 is firmly placed over the pillion foot peg 30 for cushiony resting of the pillion's foot.

The pillion footrest bracket 16 is an overhanging member with one end connected onto the swing arm assembly 11 and another end holds the pillion foot peg assembly 17. This is provided on either side of the motorcycle. The pillion footrest bracket 16, for securing the pillion foot peg assembly 17, is directly hinged along with a holder pillion foot peg 22. Wherein the holder pillion foot peg 22 is an integral part of the pillion footrest bracket 16.

**In another embodiment** the pillion foot peg assembly 17 as shown in Fig.7 is directly hinged along with a holder pillion foot peg 22 such that the said holder pillion foot peg 22 is isolated from the pillion footrest bracket 16 through cushion means 32, which is located at the mounting boss 33 of the pillion footrest bracket 16.

By using the above three embodiments the pillion footrest vibrations were effectively reduced thereby increasing the pillion ride comfort.

**Claims:**

- 5 1. A vibration damping assembly for a two-wheeler comprising a mass-A 24 and a bracket 27 connected to a first side of a pillion footrest bracket 16 along with an external overhanging mass 19.
- 10 2. The vibration damping assembly as claimed in claim 1, wherein the external hanging mass 19 is a muffler assembly.
3. The vibration damping assembly as claimed in claim 1 or 2, wherein the external mass 19 is connected to the pillion footrest bracket by a screw and nut arrangement.
- 15 4. The vibration damping assembly as claimed in claim 1, wherein the mass-A 24 is a metallic member.
- 20 5. The vibration damping assembly as claimed in any one of the preceding claims, wherein the metallic member is connected to the bracket by a suitable fastening means or by welding or by providing the metallic member as an integral part of the said bracket.
- 25 6. The vibration damping assembly for a two-wheeler comprising a pillion foot peg assembly 17 mounted on holder pillion foot peg 22 wherein a mass 31 is integrally connected to pillion foot peg 30 of the said pillion foot peg assembly.
7. The vibration damping assembly as claimed in Claim 6, wherein mass-B 31 is a metallic member, said metallic member is connected to the pillion foot peg 30 by means of fastening or welding.

30

8. The vibration damping assembly as claimed in Claim 6 wherein the pillion foot  
peg assembly 17 is directly hinged along with a holder pillion foot peg 22 such  
that the said peg is isolated from the pillion footrest bracket 16 through cushion  
means 32 located in the mounting boss 33 of the said bracket 16.

9. The vibration damping assembly as claimed in claim 6 to 8 is located opposite  
side of the muffler mounting of the two wheeler.

10. A two-wheeler incorporating the vibration damping assembly as claimed in any  
one of the claims 1 to 9.

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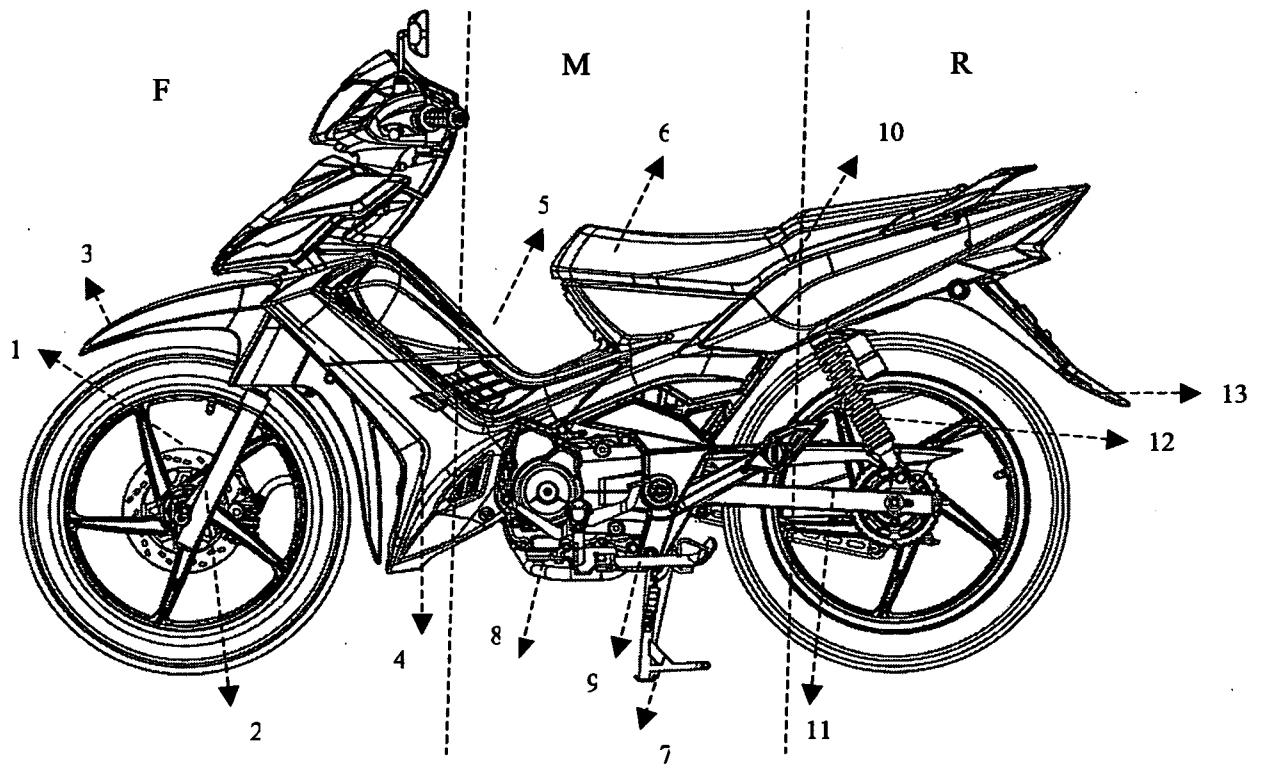
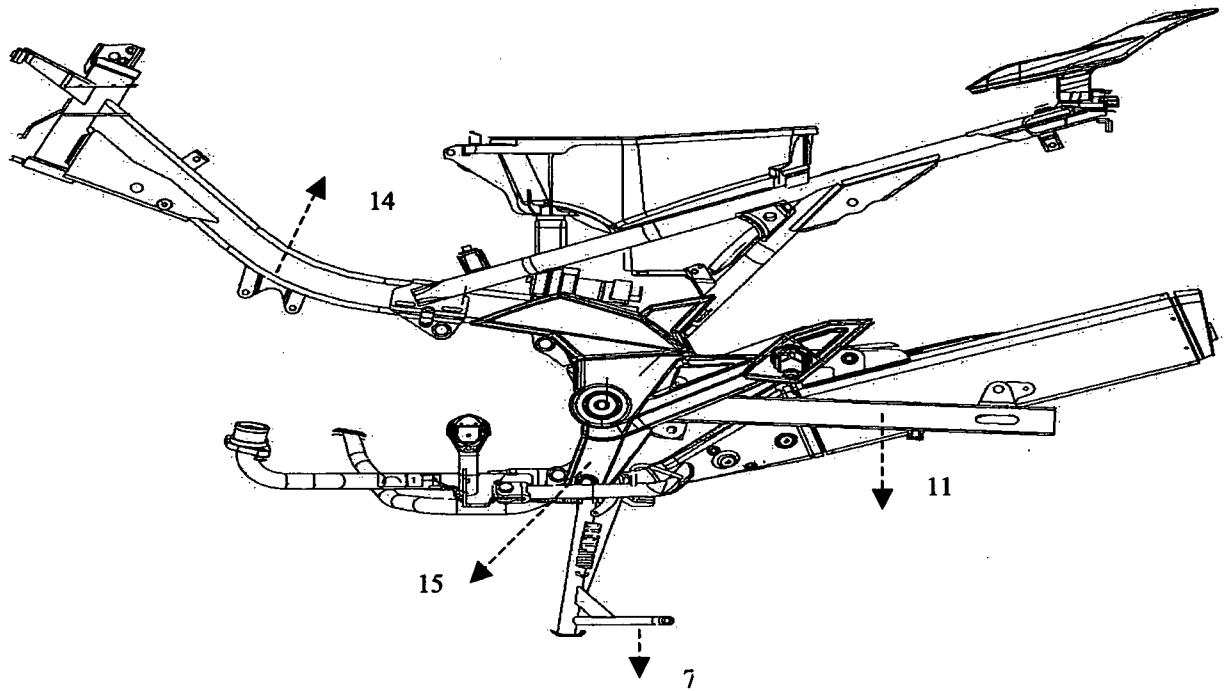


Fig.1

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**Fig.2**

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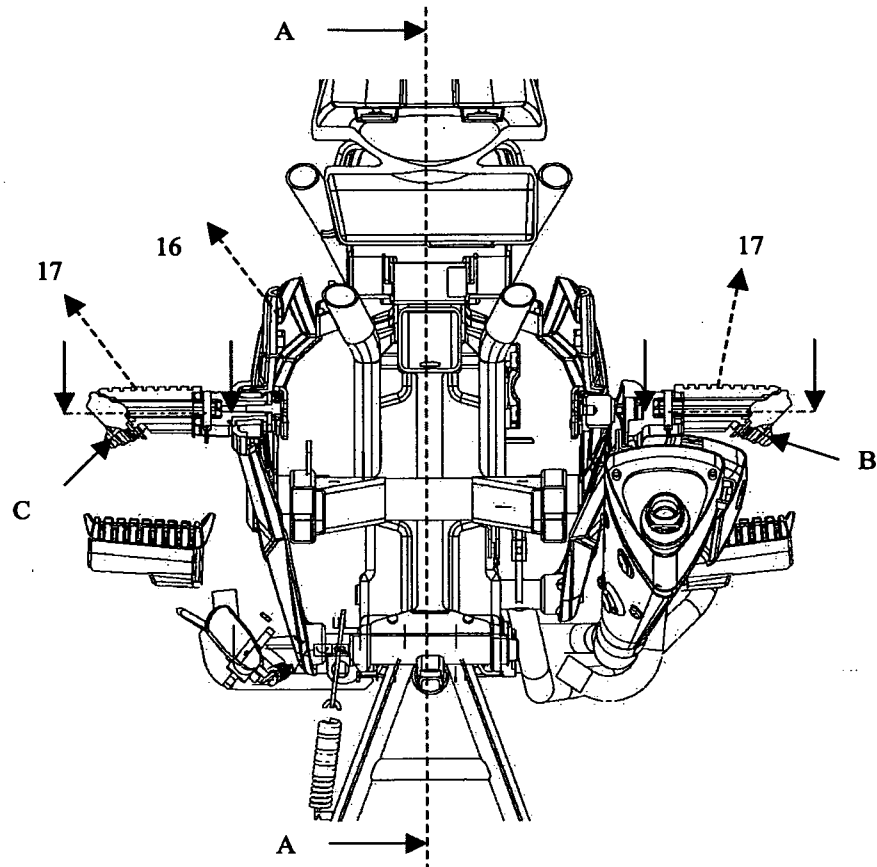


Fig.3

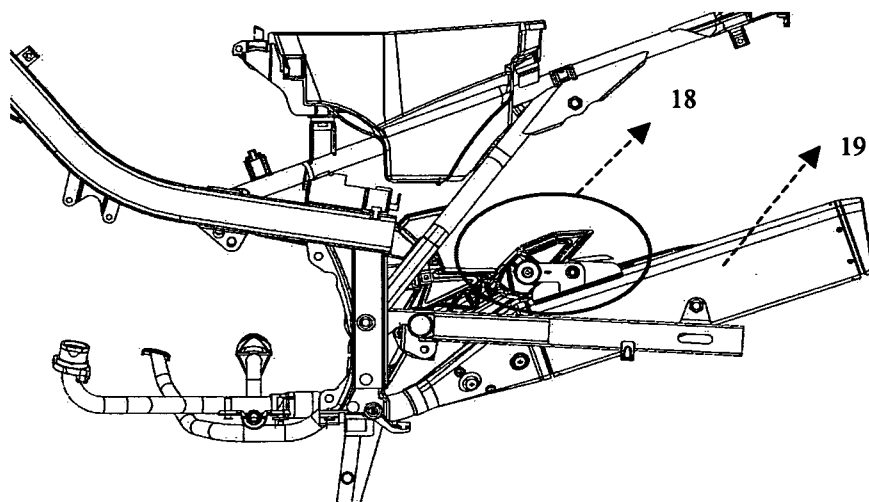
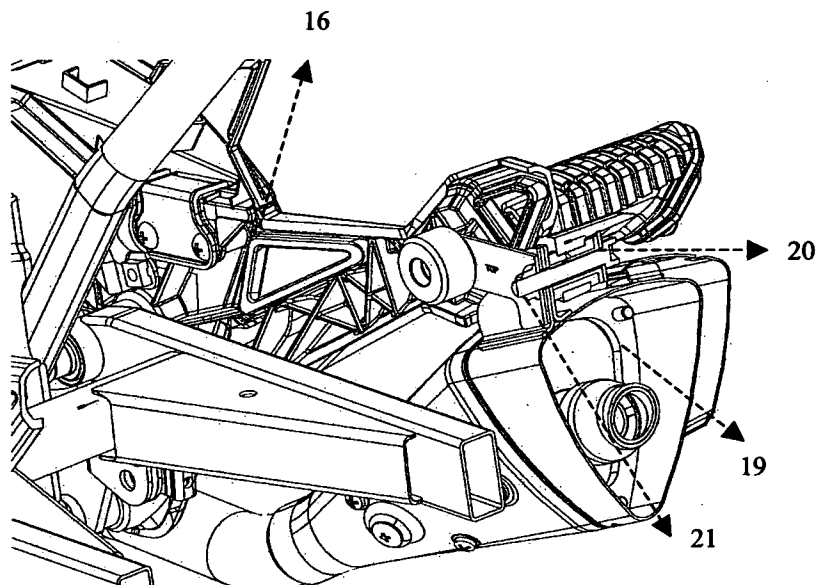
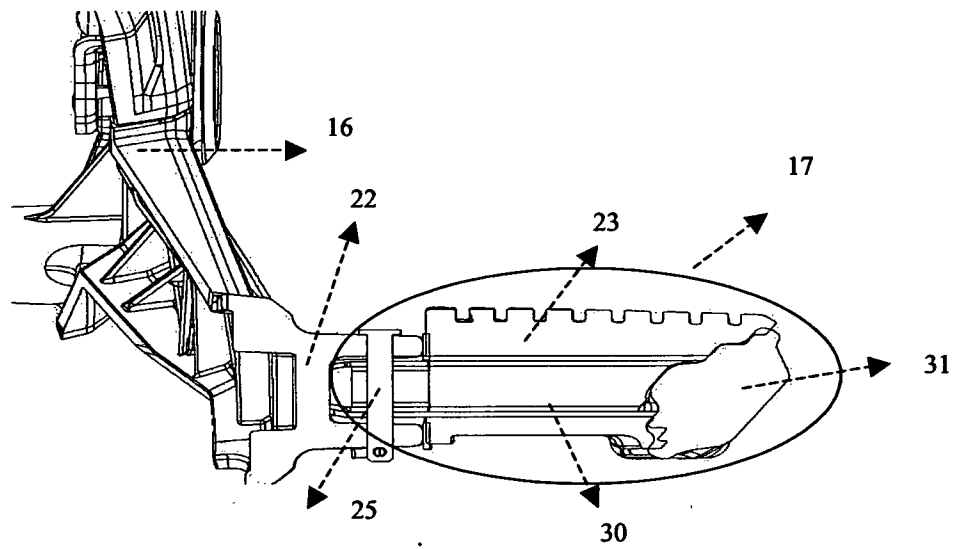


Fig.4

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**Fig.5**



**Fig.6**

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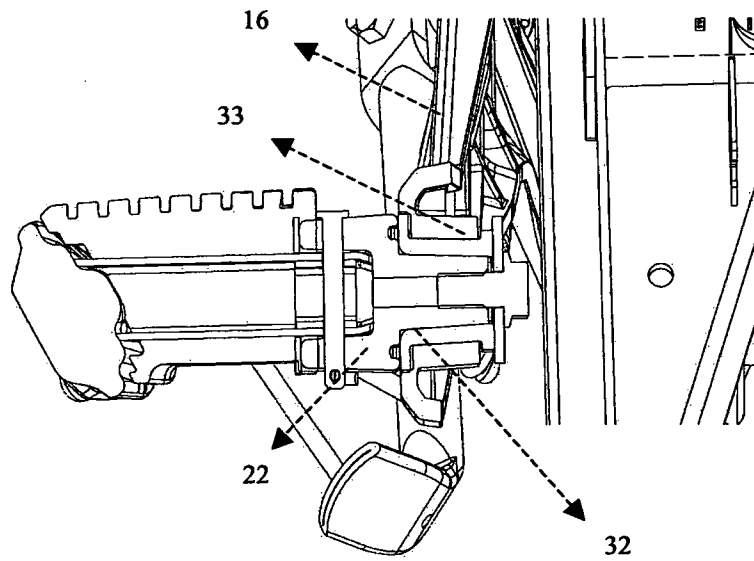


Fig.7

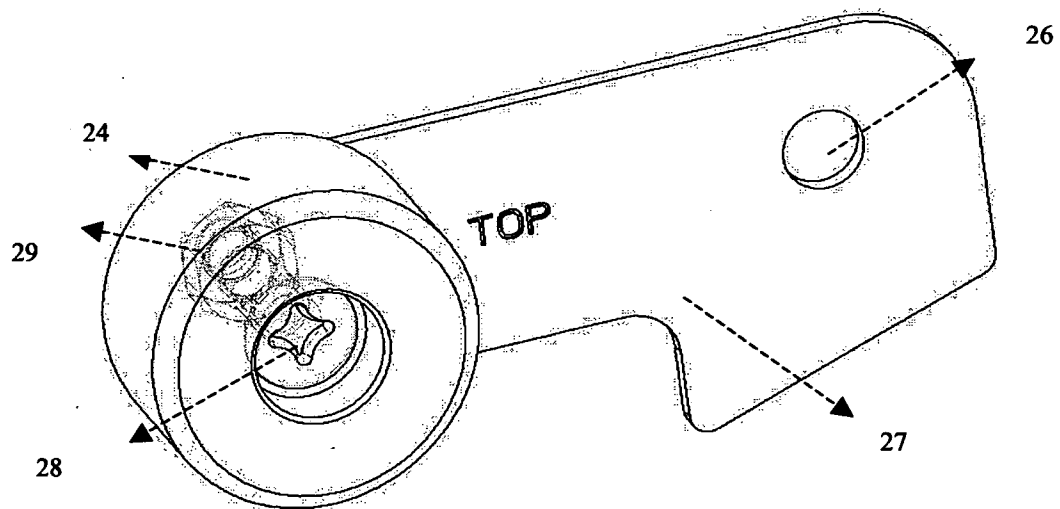


Fig.8