A steering head for motorcycles integrating steering damping means

Figure 1 Exploded drawing of the MR motorcycle steering damper

Patent Status
World Intellectual Property Organization (WIPO), patent released
EU patent released
US patent released
Working prototype

Intellectual Property
University of Florence (www.unifi.it)
Abstract

The present invention refers to the field of steering dampers for motorcycles, and most in particular it concerns a steering head integrating a magnetorheological (MR) steering damper. As known, a steering damper damps down on oscillations that can occur on the steering system and be transmitted to a driving member such as a handlebar of a motorcycle. Specifically in the field of motorcycling, it is particularly critical when there are such oscillations, since they can give way to a phenomenon of instability also known as the wobble effect. If not suitably dampened, the Wobble effect can also be very dangerous for the rider since it can lead to riding difficulties and the loss of control of the motorcycle.

The object of the present invention is to provide an actual steering head integrating a damper with MR fluid in order to increase the efficiency and to reduce the constructive complexity maintaining a high riding comfort and to provide a steering head easily to assemble and disassemble.

Figure 2 Physical prototype of the MR motorcycle steering damper
Technology and its advantage

The patent proposes a MR steering damper fully integrated in the motorcycle steering head. Unlike conventional steering dampers, this device reduces the relative rotation between the shaft and the steering head by a fluid activate by a magnetic field. The magnetic field goes radially from the shaft of the steering by closing on the steering head.

Its main advantages are ease of installation inside the headset (assembly and disassembly), a damping approximately null in absence of magnetic field (viscous component) and a damping achieved through the action of the magnetic field that exceeds the requirements of the project specifications (results from FEM analysis).

Although limited to low rotation speed only, this trend is confirmed by experimental tests to which the physical prototype has been subjected.

![3D view of the MR motorcycle steering damper](image)

*Figure 3 3D view of the MR motorcycle steering damper*
Figure 4 Steering damper characteristic: virtual testing (0A, 1A and 2A) and technical specification (viscous and magnetic components)

Figure 5 MR motorcycle steering damper characteristic (from testing)
Market opportunity

The invention can be of interest for the motorcycle manufacturers (OEMs), especially the ones that produce large to medium-sized motorcycles.

The device described in the present patent can contribute to increase the motorcycle handling and rider comfort.

Inventors

Marco Pierini, Niccolò Baldanzini, Alessandro Giorgetti, Simone Piantini, Cosimo Monti

Contacts

Università degli Studi di Firenze
Trasferimento delle Conoscenze e Valorizzazione della Ricerca
Viale G. B. Morgagni, 40 - 50134 Firenze
Tel +39 055 2751920/21/22
e-mail: brevetti@csavri.unifi.it, posta certificata: csavri@pec.unifi.it
P.IVA | Cod. Fis. 01279680480