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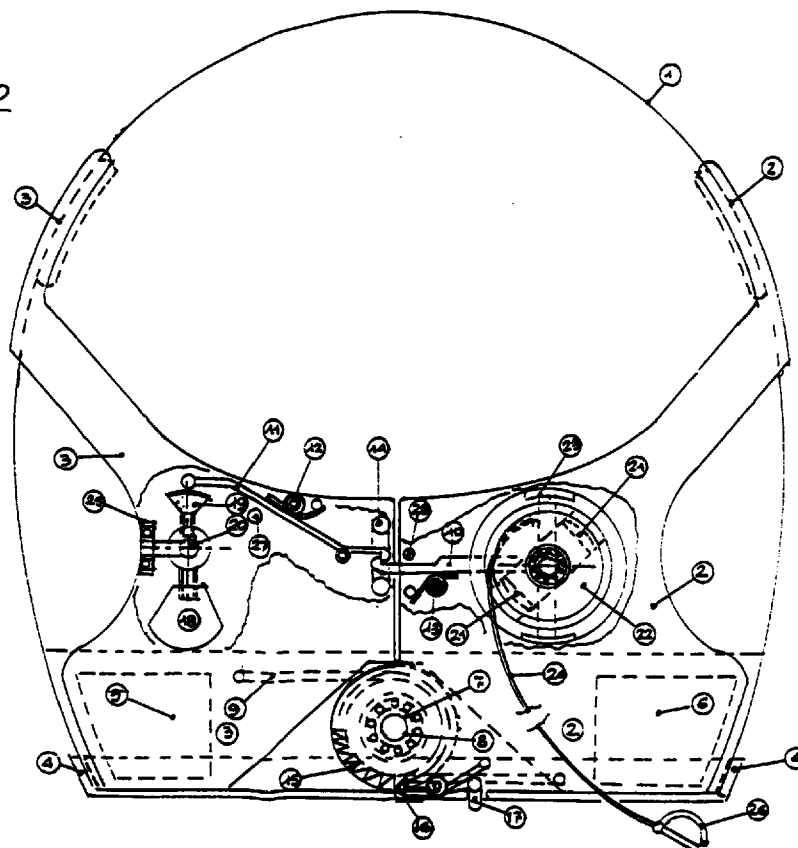
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(54) **Mechanical safety device for crash helmets**

(57) A safety device for crash helmets directly adaptable to conventional crash helmets or encompassed in newly manufactured helmets, characterized by rotating appendages triggered by inertial sensors.

This invention is particularly suitable for preventing irregular movements, compression and rotation of the neck caused by accident trauma.

FIG. 2



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## Description

The present invention relates to a safety device for crash helmets for the purpose of preventing irregular movements, compression and rotation of the neck caused by accident trauma.

Accidents involving motorcyclists often cause the motorcyclists to sustain serious injuries. Among the most serious of these injuries are violent impacts to the spinal column and irregular movements, compression and rotation of the neck, which motorcyclists involved in road accidents often sustain. Conventional crash helmets are designed to prevent or reduce head injuries, but they do not protect motorcyclists against impacts to the spinal column or irregular movements, compression and rotation of the neck.

The present invention concerns a safety device for crash helmets for the purpose of preventing irregular movements, compression and rotation of the neck caused by accident trauma.

The present invention further concerns a safety device that can be integrated into already existing crash helmets or directly inserted into newly manufactured crash helmets.

The present invention seeks to provide a mechanical safety device for crash helmets for the purpose of preventing irregular movements, compression and rotation of the neck caused by accident trauma. This device can be integrated into already existing crash helmets by means of a hook or directly inserted into newly manufactured crash helmets.

In accordance with the invention, the device is a streamlined structure, essentially characterized by two mobile appendages, rigorously attached to the lateral surface of a helmet and in perfect symmetry with the helmet's longitudinal axis. Movement of the appendages is triggered by inertial sensors. The device is equipped with a robust hooking system for attachment to a crash helmet. The appendages, operatively connected to two rings of ball bearings, are hinged to a support at the base of the helmet. Because of their particular shape, when the appendages are completely expanded, as well as pressing on the shoulders of the person wearing the helmet, they prevent compression to the neck by completely blocking the rotation of the head.

A robust, coaxially hinged spring rotates the appendages by simultaneously turning them in opposite directions. The two ball bearing rings work in accordance with the spring and are interfered with by means of a pin that is used to block the rotation of the appendages at a particular point.

One of the inertial sensors, having an oscillating mass, is sensitive to inclinations and violent accelerations. Another sensor, having a centrifugal mass, is activated by a cord that is sensitive to abrupt, sharp movements linked to the main frame of the motorcycle. The activation of the movement of the protective appendages

starts when the motorcyclist assumes an abnormal position or a violent acceleration. The sensors detect the abnormal movements and activate rotation of the appendages. To guarantee an effective and stable closing of the appendages when the helmet is not in use, the activation of the two highly sensitive inertial sensors is inhibited by a manually operated safety device.

The integration of the device with crash helmets makes the helmets safer than conventional helmets and more suitable to reduce the severity of traumas caused by the violent impacts of the spinal column and irregular movements, compression and rotation of the neck, which motorcyclists involved in road accidents often undergo.

The invention will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a lateral perspective view of a helmet equipped with a safety device, constructed in accordance with a preferred embodiment of the invention; and

Figure 2 is a plan view, as viewed from the back, of the device of Figure 1 with a particular view of the inertial sensors.

Figures 1 and 2 illustrates a safety device for crash helmets, characterized by a set of appendages 2 and 3 securely fastened to the external surface of a helmet 1 in perfect symmetry about a longitudinal dividing line of the helmet 1. The appendages 2 and 3 are expanded by means of inertial sensors 22 and 27 in accordance with a preferred embodiment of the present invention.

The appendages 2 and 3, attached to two rings of ball bearings 7 and 8, are hinged on a support 4 and are suspended by a large, coaxial spring 9 that allows the appendages to turn simultaneously in opposite directions. A self-blocking pin 16 is used to block contra-rotation of the rings by maintaining their open position.

The release system 17 is necessary to reset the closing of the appendages 2 and 3; the eventual reopening click is blocked by a safety device 14 that inhibits the decoupling of hooks 10 and 11 suspended by springs 12 and 13 attached to the sensors 22 and 27.

The decoupling of the hooks 10 and 11 is activated by the sensors 22 and 27 and starts the rotation of the protective appendages 2 and 3. The oscillating mass sensor 27, which is sensitive to dangerous inclinations and violent accelerations, is comprised of a rotating part having a ball bearing ring 25 and a pivot pin 20 that supports two diametrically opposed masses 18 and 19.

The centrifugal mass sensor 22, comprised of two masses 21, is sensitive to pulls induced by a cord 24 connected by a hook 26 to the chassis of a motorcycle. The centrifugal mass sensor 22 has a pivot pin 29 in a central position, around which a hook 10, suspended by a spring 13, can rotate in a limited fashion, insomuch as

it is blocked by a blocking pin 28. Due to violent turns induced by pulls to the cord 24, the masses 21 interfere with an expansion 23 that works in accord with the hook 10, causing the hook to turn for release. When release occurs, an instant expansion of the appendages 2 and 3 blocks the repeated and violent movements of the body. The foregoing description is for purposes of illustration only and is not intended to limit the scope of protection accorded this invention. The scope of protection is to be measured by the following claims, which should be interpreted as broadly as the inventive contribution permits.

### Claims

1. A safety device for crash helmets comprising two or more appendages attached to a crash helmet having an external surface, a base and a longitudinal dividing line, wherein the appendages are rigorously attached to the external surface of the helmet in perfect simmetry to the longitudinal dividing line of the helmet and are rotated by a spring activated by inertial sensors.
2. A device as claimed in Claim 1, further comprising two rings of ball bearings acting in accordance with the spring for rotating the appendages, wherein the rings are operatively connected to the appendages and to a support located at the base of the crash helmet.
3. A device as claimed in Claim 2, wherein the spring acts in conjunction with a pivot pin of the ball bearing rings allowing rotation of the appendages in opposite directions.
4. A device as claimed in Claim 2, wherein a self-blocking pin blocks the contra-rotation of the ball bearing rings by maintaining an open position.
5. A device as claimed in Claim 1, wherein the movement of the appendages is blocked by a manually operated safety device when the crash helmet is not in use.
6. A device as claimed in Claim 1, wherein the rotation of the appendages is activated by two main sensors, a first sensor comprised of an oscillating mass which is particularly sensitive to inclinations and accelerations, and a second sensor comprised of a centrifugal mass which is activated by pulling a cord that links the second sensor to a vehicle in which a person wearing the helmet is riding.
7. A device as claimed in Claim 1, further comprising means for attaching the device to an existing crash helmet.
8. A device as claimed in Claim 1, further comprising a release system for closing the appendages.

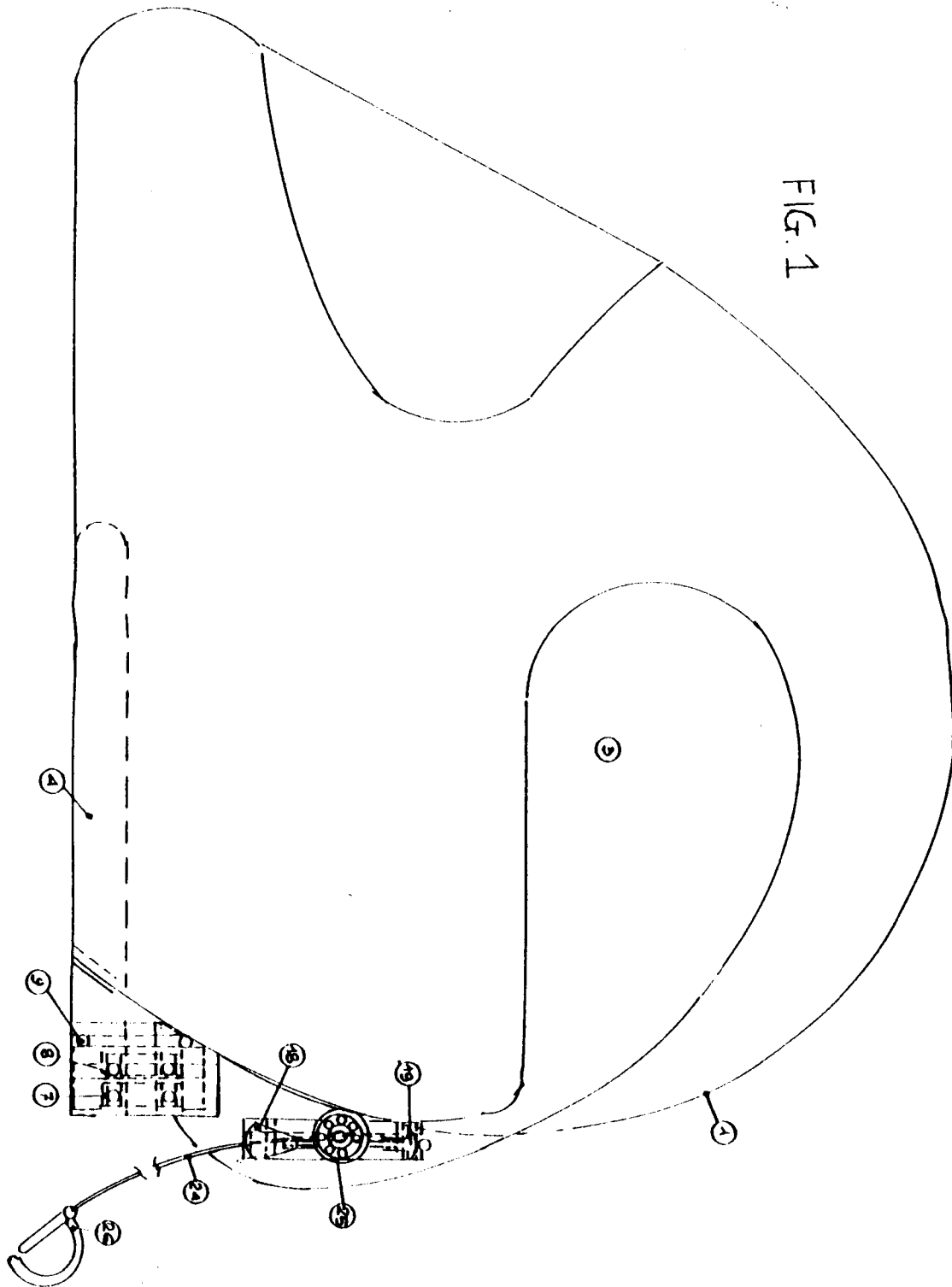


FIG. 2

