Description of the industrial invention having the title:

ANTI DIVE DEVICE FOR TELESCOPIC FORKS OF MOTORCYCLES

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This invention relates to an anti-dive device for the telescopic forks of motorcycles having the purpose of improving the braking limiting the “diving” of the front fork that occurs following the change of trim due to the deceleration that transfers the weight of the motorcycle on the front, causing at the same time, under severe braking, the lifting of the rear wheel, with sharp deterioration of the braking itself.

A direct consequence of this behaviour during braking consists in the fact that the strong suspension stroke alters the geometry of the chassis, and this constitutes a factor of deterioration of the driving of the motorcycle.

According to the known technique, one tries to counter the phenomenon of the diving in the braking phase in different ways. The most common - besides the contrasting force of the springs of the front fork - is the use of the damping force of the hydraulic fluid contained in the same but in addition to being temporary, only during the phase of diving, it deletes the damping capacity when the front fork, during braking, is completely dove.

This invention solves at least in part the inconvenience described through a device, conforming to claim 1, having the function of anti-dive device for telescopic forks of motorcycles in which there is a steering pin which rotates on bearings fixed in the steering head of the frame and is characterized by comprising hydraulic means operable

to cause the axial sliding of the lower plate of the fork and accordingly the impossibility view of the same, now in the end position, to lift the steering tube and consequently the front part of the frame itself, in such a way as to compensate, at least in part, the lowering of the front of the motorcycle that occurs during braking due to the transfer of the load on the front of the same due to the deceleration.

The anti-dive device according to the invention includes:

• a hydraulic piston, integral with the steering pin and sliding in a cylindrical seat formed in the lower plate of the fork;

• a device for hydraulic adjustment in the flow of supply and return of the hydraulic piston integral with the steering pin, the device controls the hydraulic fluid, pressurized by a hydraulic pump in the phase of braking of the motorcycle, both in outward and return phase;

• an elastic element adapted to bring back to position the bottom plate of the fork, when it ceases the thrust of the hydraulic fluid on the hydraulic piston integral with the steering pin, in the phase of release of the lever or pedal of the brake pump;

The application of a device according to the invention therefore allows to leave the free fork damp the roughness of the road even with a calibration of the same softer and therefore more comfortable but changing only the length of the fork itself and thereby keeping within certain limits, unchanged geometry of the chassis.

To vary the length of the front fork is used the oil pressure of the front brake master cylinder through a brake booster that multiplies the force and extent of the hydraulic fluid.

The invention will now be described, by way of example and not limitation, according to a preferred embodiment and with reference to the attached figures, in which:

• Figure 1 shows the anti-dive device according to the invention in the inactive

configuration;

• Figure 2 shows the anti-dive device according to the invention in the working configuration.

With reference to Fig. 1, with (1) denotes a steering pin which rotates on a pair of bearings (11) fixed in the steering head of the frame (12). The lower end of the steering pin (1) is shaped as a hydraulic piston (3) sliding within a cylinder formed in the lower plate of the fork (2). In this way the possible inflow of the hydraulic fluid causes the downward sliding of the lower plate of the fork (2) causing a lifting of the front part of the frame (12).

The top of the steering pin (1) is fixed in the upper plate of the fork (5) which is made slidable with respect to the chain stays of the fork (6), or stems, depending on the type of the telescopic fork, by a pair of bushings (4) or bearings, so as to allow the axial movement of the set of fork composed of the stems or sheaths (6) and the lower plate of the fork (2) relative to the frame (12).

The axial movement of the piston (3) is actuated by hydraulic fluid pressurized by a hydraulic pump (not shown in the drawing), also assisted steering, in the phase of braking the motorcycle.

The steering pin (1) extends at the bottom, in which is located at least one helical spring (7) (or a disc spring, not shown in the drawings), equipped with a limit switch (8) integral with the steering pin (1), whose function is to bring back to position the steering stem (1) itself when it ceases the thrust of the hydraulic fluid in the release phase of the lever or pedal of the brake pump and to avoid that in case of lifting of the front wheel, the telescopic fork slides off.

To ensure the hydraulic seal are provided sealing rings (9) between the piston (3) and its cylindrical seat, and between the lower part of the steering pin (1) and the lower plate of

the fork (2).

The detail of Figures 10 shows a hydraulic adjusting device (10) in the flow of power to the hydraulic piston (3) integral with the steering pin (1). This device performs the adjustment of the hydraulic fluid in both outward and return phase.

The hydraulic circuit is assisted so as to ensure sufficient flow of hydraulic fluid to power the hydraulic piston (3).

The hydraulic oil is conveyed through a pipe to a hydraulic piston (3) located in the lower plate of the fork (2) and integral with the steering pin (1) in correspondence of the lower part of the steering tube so as to lift the front of the frame (12) offsetting the diving of the forks that in modern motorcycles can reach 120 millimetres.

It is estimated that it is possible to have an elongation of the fork, and then a lifting of the front brakes even of 50 mm with a 40% improvement, without excessively modifying the lower plates of the fork of existing motorcycles.

To allow the lengthening of the telescopic fork during braking this must be changed in correspondence of the upper steering column plate (5) leaving free the sheaths (6), by means of bushings (4) or bearings, to scroll down in the phase of elongation of the assembly fork thimbles under the pressure of the hydraulic piston (3) and to return to position when the pressure decreases, but while maintaining the rigidity of the two steering plates for proper driveability.

To facilitate the return in position of the steering tube the device is provided with a dedicated spring on the lower part of the steering plate that works in synergy with the springs of the telescopic fork and has the purpose of keeping in position the steering tube in the resting phase and also when the wheel is lifted from the ground.