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(54) A FORK COLUMN FOR A MOTORCYCLE AND A MOTORCYCLE FORK COMPRISING THE COLUMN

(71) I, CHRISTIAN BOURCIER DE CARBON, a French citizen of 64, Boulevard Maurice-Barres, Neuilly-Sur-Seine, France,

do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a fork column for a motorcycle, particularly to a fork column including a hydro-pneumatic shock absorber.

Fork columns for a motorcycle provided with a shock absorber are known. These shock absorbers are generally of the hydraulic type, and are fixed to a steering column, the guiding tubes being firmly fixed to the hub of the wheel. This arrangement has the disadvantage that the suspension spring is excessively stressed and that the shock absorber operates under conditions which do not allow optimum efficiency of the shock absorber.

We have sought to remedy these disadvantages by providing a fork column incorporating a shock absorber, preferably a hydro-pneumatic shock absorber wherein the shock absorber forms the base part of the telescopic fork and is adapted to be connected to the hub of the wheel and the guiding tube is adapted to be connected to the steering column.

Accordingly the present invention provides a fork column for a motorcycle comprising a guiding tube adapted to be mounted on a steering column of a motorcycle, a shock absorber mounted in the guiding tube and including a hollow rod connected to the guiding tube, the shock absorber being adapted to be mounted on a hub of a motorcycle wheel, a suspension spring located inside the guiding tube and abutting the shock absorber and guide inserts attached to the guiding tube and spaced from one another for guiding the shock absorber in the guiding tube. Preferably the rod of the shock absorber is formed in two parts.

The fork column of the present invention has the advantage of being very supple to be capable of being used for grounds of varying roughness. As the shock absorber is preferably of the hydro-pneumatic type and its rod is connected to the steering column, the rod can support a certain load and the suspension spring may be relieved. Further, as the rod is hollow, it allows adjustment of a control means in the piston of the shock absorber without requiring the assembly to be dismantled. This hollow rod is preferably in two parts and this also enables the position of the end stops to be easily adjusted.

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

Fig. 1 is a view, partly in section, of a motorcycle fork provided with columns according to the invention, and

Fig. 2 shows, partly in longitudinal section, a fork column according to the present invention.

The motorcycle fork shown in Figure 1 has two columns 1, rigidly connected by fixing members 2 and 3 to each other and to the steering column (not shown) of the motorcycle. The members 2 and 3 are connected in a manner known per se to guiding tubes 4 of the columns. The guiding tubes 4 may have longitudinal reinforcing ribs 13, and their lower ends may have elastic protective bellows 14.

In each tube 4 is movably mounted a hydro-pneumatic shock absorber 5, supported by guide inserts 6 fixed to the column 4. The shock absorber 5 is subjected to the action of a suspension spring 7, which is accommodated in the tube 4, and bears onto a cover 8 of the tube 4. A rod 9, 10 of the shock absorber 5 is also connected to the cover 8, a stop 11 being provided at the point where the two parts 9 and 10 meet. The lower end of the shock absorber 5 has connectors 12 for connection to the hub (not shown) of the wheel.

Referring to Figure 2, the shock absorber 5 has two chambers 15 and 16 separated by a floating piston 17 equipped with a sealing ring 18. The chamber 15 is filled with gas, for instance with nitrogen, under pressure.

The chamber 16 contains a liquid, for example oil. The chamber 16 is closed at its upper end by a closure member 19 provided with a seal 20, for instance of perbunan. In the chamber 16 is displaceably mounted a piston 21 which has a throttling opening 22 which may be of the type known for instance from a double-action valve. The piston 21 is fixed to the rod 9 by a nut 23. The rod 9 has a longitudinal hole 24 therethrough and is extended by a hollow extension rod 10 which is provided at its ends with threads 25 and 26 by which it is respectively connected to the rod 9 and the cover 8. The rod 9 has above the piston 21 by-pass openings 27 co-operating with a valve 28 controlled by a tappet 29 in the hole 24. The tappet 29 extends longitudinally through the rods 9 and 10, and is connected to an adjusting screw 30 positioned at the upper end of the rod 10 and co-operating with an internal flange 31 of the said rod 10 to permit regulation accessible from the outside of the valve controlling the by-pass 28.

The guide inserts 6 attached to the tube 4, for example by force fitting, delimit between the inner surface of the tube 4 and the outer surface of the shock absorber 5 an annular chamber 32 which serves as a reservoir for lubricant, for example a thick grease. The suspension spring 7 is mounted in the tube 4 between the cover 8 and a flange 33 of a stop 34 fixed at the upper end of the shock absorber 5. A cylindrical cap 35 is positioned in the zone where the rods 9 and 10 meet, and is supported on an elastic stop 36 to co-operate, on compression of the spring 7, with the stop 34 of the shock absorber 5. A tubular member 37 providing a stop collar 38 is mounted on the rod 9 and bears on a flange 39 of the latter. When the suspension spring 7 is in the relaxed state, the stop collar 38 co-operates with an elastic stop 40 fixed inside the shock absorber 5 on the closure member 19.

The cover 8 may be provided with a yieldable protective covering 41 to avoid soiling of the adjusting screw 30 and its access orifice. The lower end of the guiding tube 4 is provided with a protective diaphragm 42.

It will be apparent that in a column 1 according to the invention, where the guiding tube 4 is connected to the steering column, and the shock absorber 5 is connected to the hub of the wheel, the rod 9, 10 of the shock absorber 5 takes part in the distribution of loads acting on the column 1 by being accessible for easy adjustment of the column 1 as a function of the quality of the ground and assumed use of the motorcycle.

Also, due to the pneumatic chamber 15 of the hydro-pneumatic shock absorber 5, the rod 9, 10 transmits onto the chassis or frame certain load which would otherwise act on the suspension spring 7. In addition, as the rod of the shock absorber 5 is in two parts 9 and 10, the compression stop 36 may easily be fixed in place and/or lifted and the choice of the length of the extension rod 10 enables the compression of the suspension spring 7 to be adjusted to a preselected value.

Because the rods 9 and 10 are hollow, the adjusting screw 30 of the valve of the by-pass 28 may be returned to the upper part of the column, which allows immediate pre-adjustment of this valve without dismantling the column.

The guide inserts 6 are connected to the guiding tube 4 so that the column may contain a reserve of lubricant 32. A greasing orifice (not shown) may be provided in the lower partition of the tube 4 to feed the chamber 32.

WHAT WE CLAIM IS:

1. A fork column for a motor cycle comprising a guiding tube adapted to be mounted on a steering column of a motorcycle, a shock absorber mounted in the guiding tube and including a hollow rod connected to the guiding tube, the shock absorber being adapted to be mounted on a hub of a motorcycle wheel, a suspension spring located inside the guiding tube and abutting the shock absorber and guide inserts attached to the guiding tube and spaced from one another for guiding the shock absorber in the guiding tube.

2. A fork column as claimed in Claim 1, wherein the inserts together with the inner surface of the tube and the outer surface of the shock absorber define at least one annular chamber which serves as a reservoir for lubricant.

3. A fork column as claimed in Claim 1 or 2, wherein the shock absorber is hydro-pneumatic.

4. A fork column as claimed in any one of the preceding claims, wherein the rod connects a piston to the guiding tube.

5. A fork column as claimed in any one of the preceding claims, wherein the rod is composed of two parts.

6. A fork column as claimed in Claim 5, wherein a compression stop is positioned at the junction of the two parts of the hollow rod.

7. A fork column as claimed in any one of the preceding claims wherein the hollow rod is provided with means for the control of the discharge of the liquid in the shock absorber in a by-pass circuit, the ends of which open into the piston of the shock absorber.

8. A fork column as claimed in Claim 7 wherein the means for regulation are con-

trolled by a control member accommodated in the hollow rod at the end thereof opposite to the piston.

9. A fork column for a motorcycle substantially as herein described with reference to and as shown in the accompanying drawings.

10. A motorcycle fork comprising two fork columns according to any one of the preceding claims wherein the guiding tubes of the columns are connected by means of connection means to the steering column of the motorcycle, the end of each shock absorber opposite to the rod of the shock absorber including means for the connection thereof to the hub of the motorcycle wheel.

11. A motorcycle fork substantially as herein described with reference to and as shown in the accompanying drawings.

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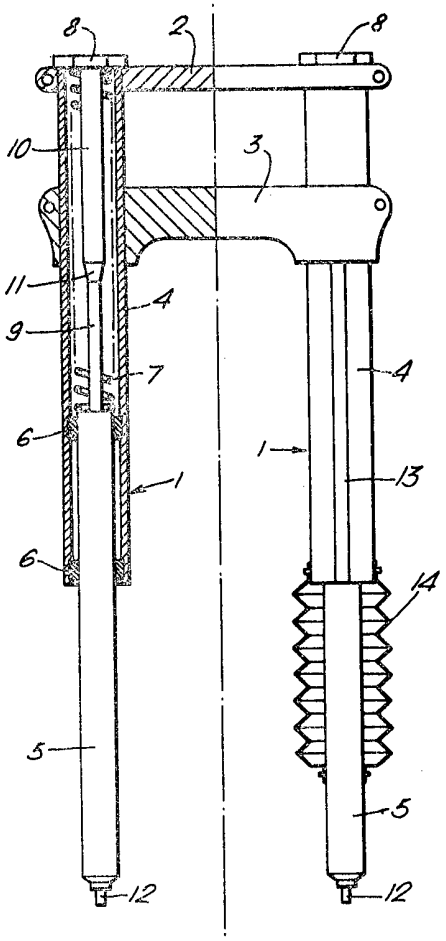
Sheet 1

Fig.1.



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Sheet 2

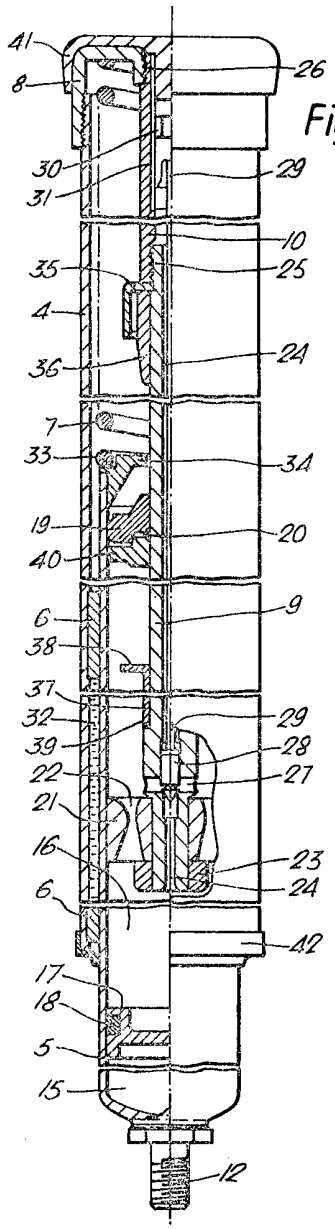

Fig. 2.