

3. The Telescopic Fork for KS 601

Designs and Method of Operation of the Telescopic Fork

The telescopic fork, in the steering head of the frame, is held in position in ball bearings by the upper as well as the lower fork connection with fork shank. The lower fork guide tubes (fork legs) slide on the hard-chromed fork tubes which are mounted in the upper and lower fork connecting members. Each of the fork guide tubes, at its lower end, has a shoe which permits easy and effortless assembling and disassembling of the front wheel without the set screws having to be removed.

In order to obtain especially soft cushioning effect, a spring unit consisting of a pre-loaded, short lower spring and, on top of it, a stronger long spring, has been inserted into each of the two fork guide tubes. The spring unit, at its lower end, is mounted in the fork guide tube and at its upper end inside the fork tube. Both springs are connected by means of a spring carrier and a clamping bolt in such a way that the two short springs under normal load, will iron out smaller irregularities, and the two stronger springs will only come into action alone at higher loads. The spring action range with completely extended fork is 120 mm, and approx. 85 mm when the motor cycle is rolling along on even ground. An oil-hydraulic shock-absorber, arranged between the fork guide tubes and the upper fork connecting member, exercises a dampening effect while the fork extends. A steering damper that can be adjusted manually has been provided at the fork shank in order to eliminate fork "whip" in motor cycles with sidecar, or on rough roads. Adjusting screws permit readjusting the damper mechanism free from play at any time.

150 c.c. of oil are filled into each fork leg in order to prevent the tubes sliding in each other from seizing. The oil is filled into the lower oil holes of the fork tubes since the telescoping movement of the springs will transport it upward. Sealing members forced into the threaded bushings at the ends of the fork guide tubes eliminate oil leakage.



Disassembling the Telescopic Fork

Repair work on the fork, i.e. on spring or guide members, can in general be carried out without the fork having to be taken out of the frame. Removing front wheel and fender only in such cases where it is absolutely necessary (e.g. when replacing fork legs) will save many work hours. For repair work on the front fork bearing there is no necessity for removing the front wheel and the fender.

First unhook the brake cable and demount the headlight, then loosen the shock absorber at the upper fork connection member, and unscrew the star knob and screw with plate of the steering damper. Now take out the rubber stoppers and loosen the two nuts each of the upper fork connection on front and rear. Finally the fork connecting member can be knocked off towards above with a rubber mallet.

Ball races can be replaced without difficulty in the usual manner.

Demounting the front wheel and the front fender will greatly facilitate repair work on the spring or guide members. Disassemble the fork in the following sequence (this covers repair work on one leg only!): Remove upper rubber stopper and take out external circlip visible under the former. Now the fork leg can be pulled downward to some extent whereby the clamping nut becomes visible; unscrew the latter. Then the fork leg can be taken off the fork tube from below.

Now the springs connected by means of the spring carrier can be taken out of the fork leg; for this purpose release and loosen the circular nut at the lower end. The long pressure spring is screwed onto the two spring carriers only. In order to remove the short spring, loosen the so-called two-hole nut. Inside the fork leg there is still the long sliding bushing which will slide out whenever the leg is knocked against wood. The long fork guide tube is clamped in position at the two fork connecting members and at the headlight bracket. The tube can be taken off from below after the screw connections provided therefor have been loosened.

At the lower part of the tube there is still the small sliding bushing which can be taken off after the retainer ring has been removed. The protective sleeves are fastened to the lower fork connecting member by means of a bayonet joint. When the punch mark of the sleeve corresponds with the recess in the fork connecting member (transverse position in relation to the direction of travel) the sleeve can be pulled off from below.

Reassembling

Reassembling the fork is done in reversed sequence. The holes in the fork tube must point towards the direction of travel.

After the spring unit has been mounted in the fork guide tube, secure the circular nut. The circlip in the upper end of the fork tube must have good fit in the groove provided therefor. When mounting the spring unit make sure that one steel disk is located over, and another one under, the circlip.

Of especial importance is the correct adjusting of the steering bearings. Bearings adjusted too tightly or too loosely will become defective within a very short time. When readjusting the ball bearings in the steering head, first loosen the two nuts which fasten the fork tubes to the upper fork connecting member as well as the two nuts of the clamping bolts which hold the upper fork connecting member to the fork shank; then only retighten the screwing on the fork shank. After readjusting, retighten the loosened nuts.

Maintenance

Drain out the oil in the telescopic fork after every 10,000 km (6000 miles), by loosening the oil drain plugs at the lower end of the two fork legs. After retightening these screws, refill 150 c. c. of motor oil:

SAE 50 with warm weather and heavy load

SAE 40 oil with warm weather and normal load

SAE 20 oil with cold weather and heavy load

SAE 10 oil with cold weather and normal load.

Use correct type of oil corresponding with outside temperatures, since the type of oil used will influence the running properties of the fork tubes. Thin oil will result in softer springing, thick oil in harder springing.

In order to fill in the oil, take off the two rubber stoppers at the upper fork end.

For steering bearing lubrication, use special grease with water-repellent properties guaranteed by the manufacturer.

Changes

Oil-hydraulic shock absorber:

For some time now we have been using oil-hydraulic shock absorbers with added cushioning power. The new model can be exchanged against the hitherto used one, yet the star knob of the steering damper at its underside must be turned off (shortened) until the knob does not touch the damper any more.

Front axle mounting:

The screw plug for the fastening of the clamping shoe of the front axle now has a round head with a transverse hole instead of a hexagonal head. Use a mandrel for loosening the screw plug.

Fork for motor cycles with sidecar:

In case the front fork must be readjusted for sidecar work, use the shorter upper spring carrier with the order No. 633 z 13 instead of the longer model No. 633 z 101. Increase the pre-load of the lower pressure springs by inserting the intermediate bushing 173 z 10.

Breakdown

Fork loses oil:

a) at the threaded bushing.

Remedy: Replace sealing member in threaded bushing.

b) Oil leakage at the headlight bracket.

Remedy: Check fork tube whether ventilation hole does not point backward and thus oil has leaked out through it into the headlight bracket.

c) Rubber stopper pops out when spring operates.

R e m e d y : Too much oil in fork. Pressure too high. Fill correct amount

Fork movement too hard or too soft, or fork kicks through*)

R e m e d y : Use the correct type of oil corresponding with outside temperatures, since the type of oil used will greatly influence the sliding properties between sliding tube and fork tube. Thin oil makes the fork operate harder, thick oil softer. Replace oil-hydraulic shock absorbers.

*) Stronger springs for extra high loads are not available.

Fork jams :

a) Fork tubes bent.

R e m e d y : Replace bent fork tubes, since straightening them is impossible.

b) Fork tubes twisted (Upper fork connecting member twisted in relation to lower fork connecting member).

R e m e d y : Straighten fork connecting members until fork tubes are aligned correctly.

Gargling noise when the fork operates :

The gargling noise noticeable whenever the short spring and the spring carrier are immersed cannot be eliminated.

Steering "whips" :

R e m e d y : Adjust bearing play in steering head.

Fork kicks, is difficult to control :

Wrong type of oil.

Protective sleeve rattles :

R e m e d y : Loosen protective sleeve, replace rubber ring.

Ball races seize :

R e m e d y : Lubricate sufficiently, re-adjust steering bearings.

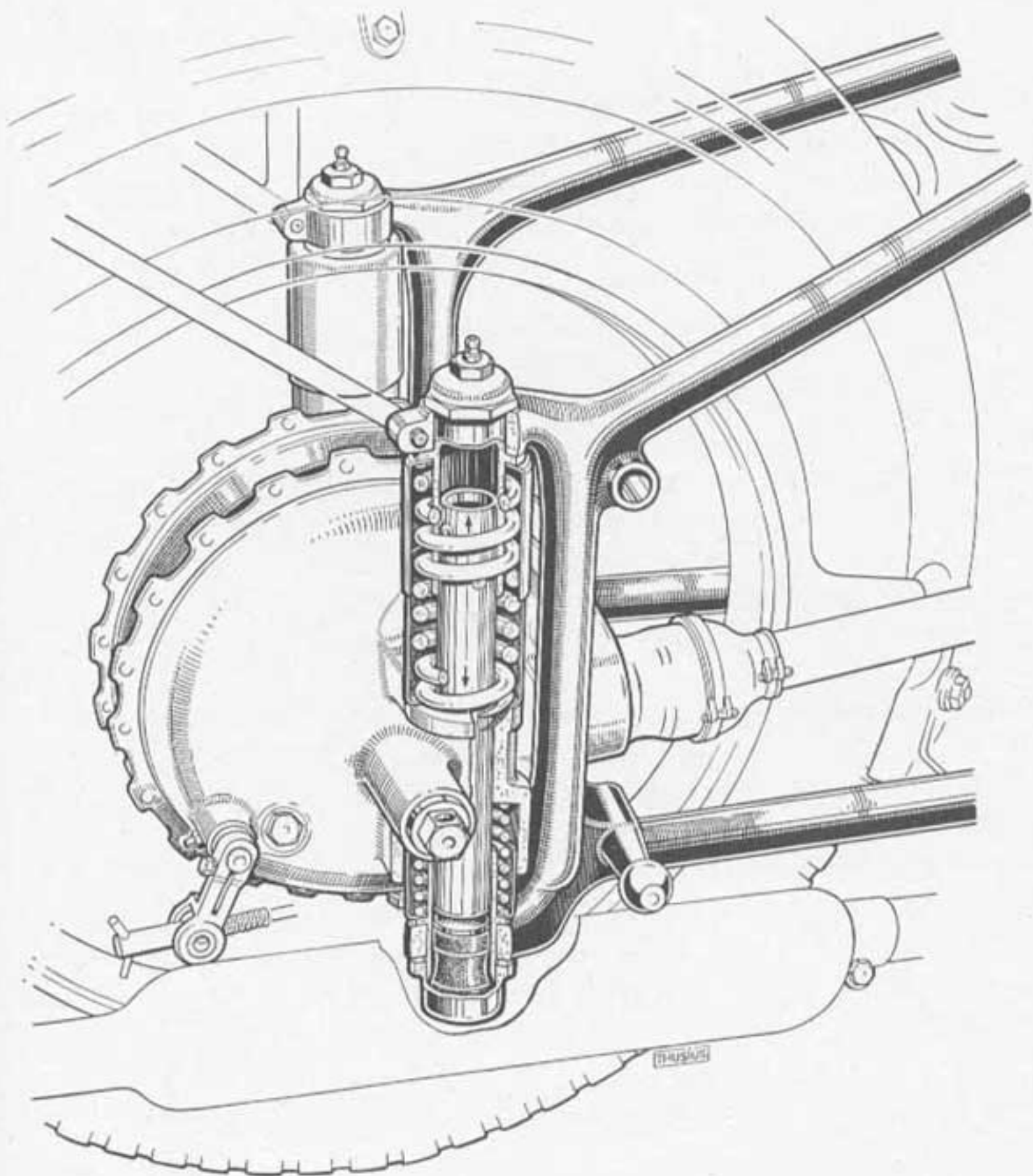
Unsatisfactory performance in solo work :

R e m e d y : Check whether fork has not been adjusted for side-car work, i. e. whether short spring carriers have been built in above. Interchange against long ones.

Unsatisfactory performance in sidecar work:

Remedy: Check whether fork has not been adjusted for solo work, i. e. whether long spring carriers have been built in above. Exchange against short ones.

Sidecar mounted incorrectly, toe-in and angle of inclination too great or too small.



2. Rear Wheel Suspension for KS 601

Rear Wheel Suspension Design

The rear wheel suspension operates after the telescopic principle like the telescopic front fork. Guide bushings have been fastened at the frame ends on top and below, in which the slide tubes fastened to the rear axle gearbox and at the left-hand spring guide are mounted slidingly. The wheel load is received by one pressure plus one additional spring each, and a catch spring on each side guarantees soft cushioning effect in central position. Rubber buffers prevent hard bumps on the catch springs whenever pressure springs extend completely during cross-country rides. Total spring movement is 64 mm. The whole spring mechanism is completely enclosed against the ingress of dirt and dust.

Disassembling the Rear Wheel Suspension

First remove the two chromium-plated lock nuts; in case of an additional spring, remove the internal circlip on which the spring rests. Now the additional spring can be taken out without difficulty, since it has been held in position by circlip and upper cover nut only.

For any further disassembling of the suspension it is imperative to demount the rear wheel. Only then the spring element can be compressed by means of our special tool ZWN 779 = 2501 k 68-0 (new Part No.) to such an extent that it can be taken out sideways between the two frame ends.

After the spring elements demounted in this way have been completely relieved of tension all individual parts are at hand without further disassembling.

Reassembling is done in reversed sequence.

Maintenance

Just grease pressure nipples every 5000 km (3000 miles) with standard type grease.

Changes

Additional spring:

From chassis No. 551 801 — and from No. 554 158 with KS 601 Sport — on no additional spring is used any more; extensive tests have revealed that such a spring will only become necessary under extraordinarily high loads. The spring can be mounted later on. Necessary parts:

2 circlips	25 × 1.2 DIN 572
2 spring carriers	630 z 202
2 springs	321 z 288
2 upper lock nuts	1001 z 125
2 rubber rings	1236 z 213
2 hex screws	1551 z 218

Breakdown

Spring action too hard (With additional spring built in):

Remedy: Remove additional spring; the additional spring has been left out from chassis No. 551 801 — and No. 554 158 with KS 601 Sport — on.

Spring action too soft:

Remedy: For extraordinarily high loads an additional spring can be built in later. For necessary parts see under "Changes".

Springing rattles:

a) during the rebound.

Remedy: Remove rubber buffer in lower lock nut.

b) during kicking through.

Remedy: Under especially high loads the upper protective spring sleeve will get in contact at the cardan housing and, as a consequence of this, it will scrape against the lower protective spring sleeve. As a remedy, cut off a portion of the lower rim of the upper protective spring sleeve.