F. Testing of Chain Tensioner

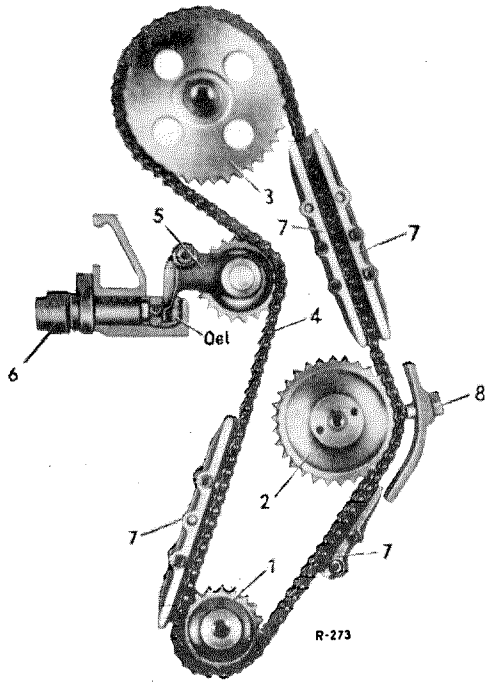

Fig. 05 — 5/9

1 Crankshaft timing gear
2 Idling gear
3 Camshaft timing gear
4 Twin roller chain
5 Tension sprocket bearing
6 Chain tensioner
7 Chain guide
8 Lock bolt

Normally, a special testing appliance is required to check the accurate functioning of a chain tensioner. For practical purposes, however, a comparison between a new chain tensioner in perfect condition and the one which is supposed to be faulty, will suffice for the purpose. The chain tensioner is placed in a receptacle, filled up with engine oil, and bled. After bleeding, it should be possible to compress the chain tensioner only very slowly and by exerting considerable force.
Chain tensioners which can be compressed easily, usually produce a rattle in the chain. If there is a whine in the chain, it can be assumed that the chain tensioner is not elastic enough.
It is advisable to replace faulty chain tensioners as a complete assembly. If individual parts are obtained for replacement, the thrust pin (2) and the thrust sleeve (7) can only be supplied together since both parts must be selected so as to match perfectly (Fig. 05 — 5/10).

The following causes may also be responsible for noises in the chain:

a) The tension sprocket bearing is fouling the oil case in the cylinder head.

When installing the tension sprocket bearing, care must be taken to ensure that the tension sprocket bearing can move freely in the oil case and that it does not strike against any part of the cylinder head.
To check this, turn the crankshaft in the direction the engine is turning until the left half of the chain is tensioned. At this point the tension sprocket bearing in the oil case in the cylinder head must be able to be moved sufficiently toward the engine center line and must not strike against anything so that the right half of the chain is also fully tensioned. If the tension sprocket bearing strikes against anything too soon, this can be remedied by re-finishing the nose A or the inner radius B of the tension sprocket bearing (see Fig. 05 — 5/12).
It is of course equally important to ensure that the tension sprocket bearing does not strike against anything on the side of the engine away from the center line either.

b) The chain tensioner is not properly bled.

To bleed the chain tensioner, the following procedure should be carried out:

Press back the tension sprocket bearing as far as it will go, using Bleeder Lever 187 589 02 63 or in an emergency, a screwdriver, and fill up the cylinder head oil case with warm engine oil (see Fig.

01 — 4/14). Now gradually release the sprocket bearing with the lever or screwdriver, at the same time continually filling up with oil, so that the oil case is always full of oil and the chain tensioner cannot suck in air.

Then "pump" the tension sprocket bearing until no more air bubbles can be seen at the chain tensioner. The important thing is to maintain the necessary oil level in the oil case during the bleeding process.

When the chain tensioner is completely bled, further pumping becomes impossible; considerable force is required to compress the chain tensioner even at the beginning of the operation.

Bleeding of the chain tensioner should be carried out with great care, since imperfect bleeding leads to chain noises when the engine is idling. Insufficiently bled chain tensioners may also cause the engine to idle unevenly.

c) There is not enough oil in the oil case.

During normal running it is possible that on bad roads or when the vehicle is suddenly stopped, oil will splash over the web and then the chain tensioner might even suck in air. In order to ensure that sufficient oil always remains in the oil case, the web can subsequently be made higher. For this purpose, the insert plate (4), together with the rubber gasket (5), is placed over the web and screwed onto the cylinder head with the hexagon socket screw (6). Two washers (7) must be installed between the cylinder head and the insert plate in order to ensure that the insert plate fits perfectly.

If the height of the web is H = 28 mm, the rubber gasket (5) (Part. No. 121987 00 46) is installed. If the height of the web is H = 32 mm, the rubber gasket (5) (Part No. 121 987 00 46) should be cut through in the middle in a longitudinal direction and only one half of it installed.

Furthermore, a new tension sprocket bearing (3) must be used when installing the insert plate (4). It is not permissible for the tension sprocket bearing to be re-machined.

The following are the parts necessary for the installation of the insert plate:

1 Insert plate, Part No. 121 016 00 41
1 Rubber gasket, Part No. 121 987 00 46
1 Washer, 8.4 DIN 433
1 Tension sprocket bearing, Part No. 121 050 09 10
1 Hexagon socket screw M 8 × 22 DIN 912 — 8 G

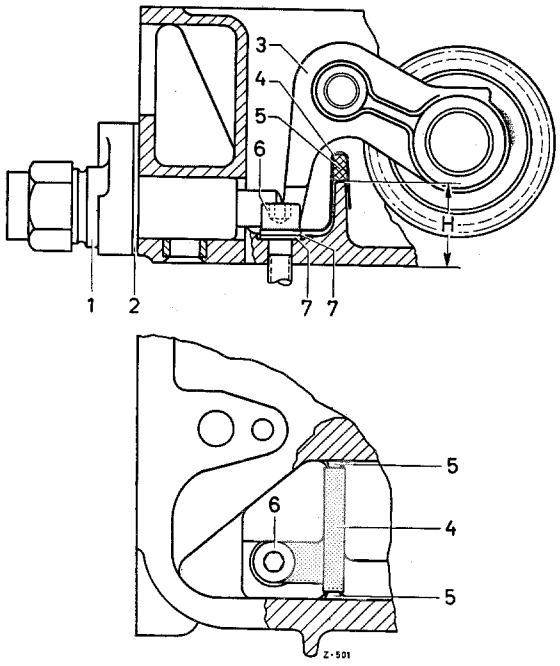

Fig. 5 — 5/9 a

1 Chain tensioner
2 Gasket
3 Tension sprocket bearing 121 050 09 10
4 Insert plate 121 016 00 41
5 Rubber gasket 121 987 00 46
6 Hexagon socket screw M 8×22 DIN 912 — 8 G
7 Washer, 8.4 DIN 433

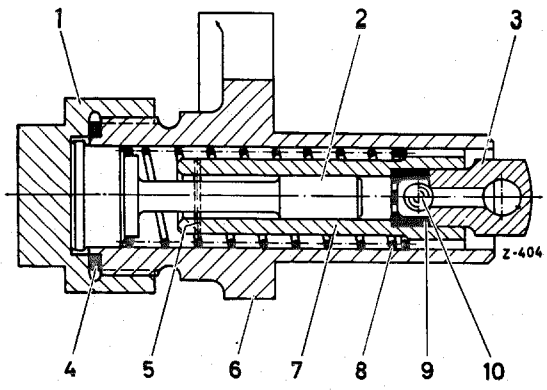

Fig. 05 — 5/10

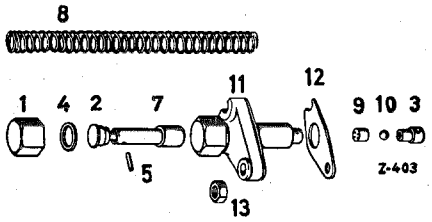

Fig. 05 — 5/11

1 Cover cap
2 Pressure pin
3 Head
4 Sealing ring
5 Dowel pin
6 Chain tensioner housing
7 Pressure sleeve

8 Pressure spring
9 Ball retainer
10 Steel ball
11 Chain tensioner assembly
12 Gasket
13 Hexagon nut

Disassembly:

1. Unscrew the cover cap (1) and take the pressure pin (2), together with the pressure sleeve (7), out of the chain tensioner housing.

2. Check the pressure spring (8) on the pressure pin and on the pressure sleeve; the pressure spring must **not** be removed for checking but should remain installed.

Testing Table for Spring:

Length L free	Length L_1 loaded		Load P_1	Length L_2 under final load	Load P_2
mm	mm		kg	mm	kg
118	44		1.85	38	1.9—2.05

3. The pressure pin and the pressure sleeve must not be disassembled. The following is the reason:

   When the dowel pin (5) is knocked in, a burr is formed in the bore. If the pressure pin is pulled out, the burr will cause scoring of the surface of the pressure pin. This scoring alone is sufficient to reduce the period of circulation of the oil sufficiently to render the chain tensioner unserviceable.

   When faults occur, therefore, the pressure pin must always be replaced together with the pressure sleeve.

   The individual replacement of the head, the ball and the ball retainer is not advisable. If faults occur in these parts, the complete pressure pin assembly, together with pressure sleeve and including the ball retainer, the ball and the head should be replaced.

Reassembly:

4. When assembling, take care to ensure that the pressure spring does not jam, that the dowel pin is tightly seated and does not foul the spring and that the sealing ring is correctly placed.

5. Place the chain tensioner in a receptacle, fill it up with engine oil, bleed it and check that it is functioning efficiently.

Note: When installing the chain tensioner in the engine, the chain tensioner **must not be filled with oil** as otherwise the housing would be forced when the nuts are tightened up. The bleeding process must then be repeated with the chain tensioner installed in the engine. When this is done, there must be sufficient engine oil in the oil case in the cylinder head.