II. Adjusting Feed Begin

a) General

The feed begin is adjusted according to the overflow method, meaning the rising plunger is just covering the control port, so that the oil discharged by the pump of the test stand can no longer pass through the control port.

At the same time the feed beginning must correspond to the stroke advance listed in column A of the test data sheets. The stroke advance is adjusted with the help of the Bosch Test Device EFEP 51 for the OM 636 and with the measuring device EFEP 303 and a dial gauge for the OM 621.

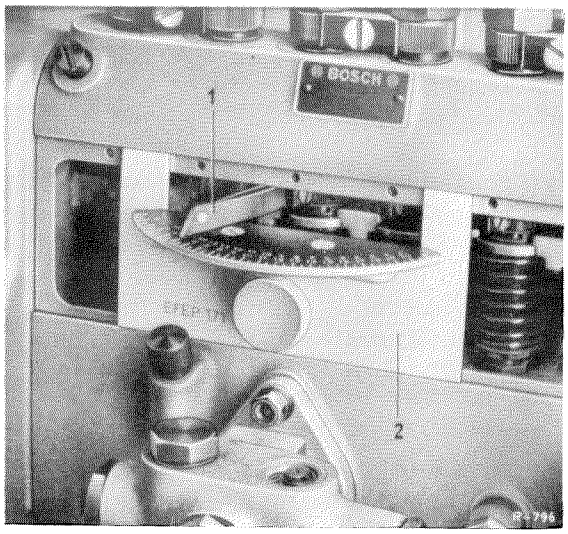

Figure 07–5/4

1 Needle attached to a pinion segment
2 Fixture EFEP 171

b) Preparing the Pump

A OM 636

1. Secure the pump and bleed as described below. The protecting cover must remain on the tappet housing, so that the test oil cannot flow into the pump.

   Connect the feed line (3) to the pump, operate the pump with a speed of approx. 50 rpm until the test oil flowing out at the bleeder screws (5) of the suction space is free of bubbles and the pipe connectors (4) have been flushed (Figure 07–5/3).

   Stop the pump and connect the pressure lines to the injection pump.

   Operate the pump with a speed of approx. 200 rpm until pump and nozzles work satisfactorily.

   Remove the protecting cover.

Note: In order to test and adjust injection pumps with **EP/RSV-centrifugal governors** by using the control rod fixture EFEP 42 the governor cover must be removed. (The governor is disengaged).

When checking **only** the governor and the full load discharge, the governor cover must not be removed if the fixture EFEP 171 (1) is used for the test (see Figure 07–5/4).

2. Mount the control rod adjusting fixture EFEP 42 (Figure 07–5/5). Move control rod with adjusting lever to max. stop position. Mount the adjusting fixture in this position, so that the plug bolt engages in the zero mark of the perforated plate. Then adjust the control rod according to the boxed-in value of constant delivery specified in the test data sheet.

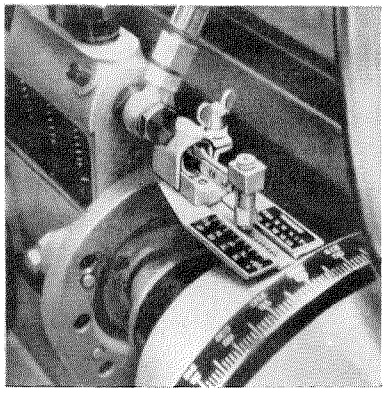

Figure 07–5/5

B. OM 621

1. Unscrew the feed pump, unscrew the overflow valve and close the bore with a plug.

2. Remove the governor. With the pneumatic governor, this is done after unscrewing the cover, by removing the cotter pin and unhooking the complete diaphragm. On pumps with RSV governor it is possible, after unscrewing the cover, to unhook the control rod by lifting the leaf spring on the governor linkage.

3. Chucking and bleeding the pump (see item 1, Section A, OM 636).

c) Adjusting Stroke Advance and Checking Feed Begin

1. Adjusting Stroke Advance

Turn camshaft of pump in sense of rotation until the plunger next to the drive is in top dead center.

For the OM 621, fit the measuring device (5) EFEP 303, part No. 0000 589 85 21 on the injection pump so that the feeler (4) of the measuring device is faultlessly seated on the tappet sleeve (7) of the 1st pump cylinder, however, does not graze the tappet spring (6) (see Figure 07–5/6 and 07–5/6a). Then the dial gauge should have a pre-tension of approx. 0.5 mm; turn dial of gauge in such a way that the hand is on zero.

On the OM 636, set up the measuring device EFEP 51 (2) and engage it with the roller tappet (1) of the piston mentioned before. Set the dial gauge to zero (Figure 07–5/6b).

Turn pump further in direction of rotation until the hand of the dial gauge indicates the value specified for stroke advance.

Note: With the OM 621, it is not possible to go on turning to TDC when the measuring device is mounted, because the feeler (4) of the measuring device strikes the control rod (3) (see Figure 07–5/6a).

The needle (8) at the graduation scale of the test stand has to be adjusted to a number favorable for further testing (see Figure 07–5/3).

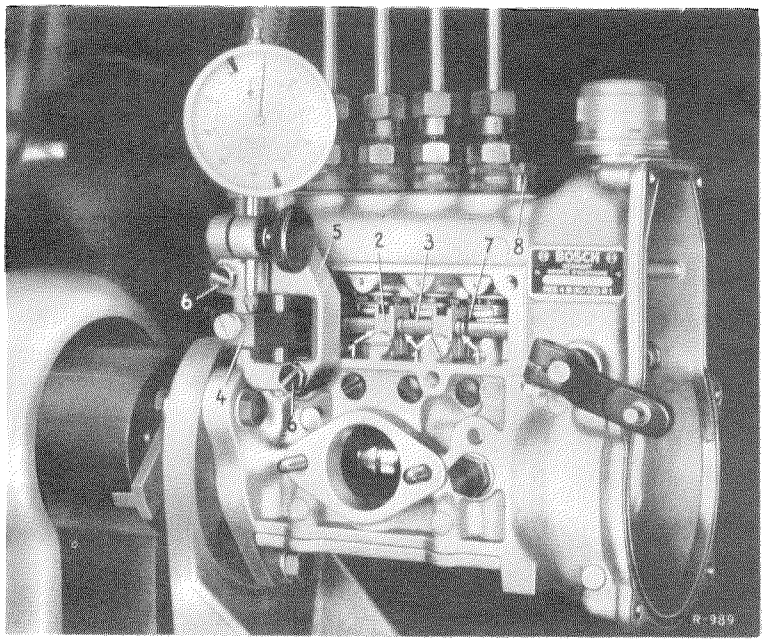

Figure 07–5/6

1 Marks for mounting the clamping pieces
2 Clamping piece with guide groove and screw
3 Control rod
4 Feeler of measuring device
5 Feed begin (stroke advance) measuring device EFEP 303, part No. 000 989 85 21
6 Hex hd. screws
7 Lock ring
8 Bleeder screw

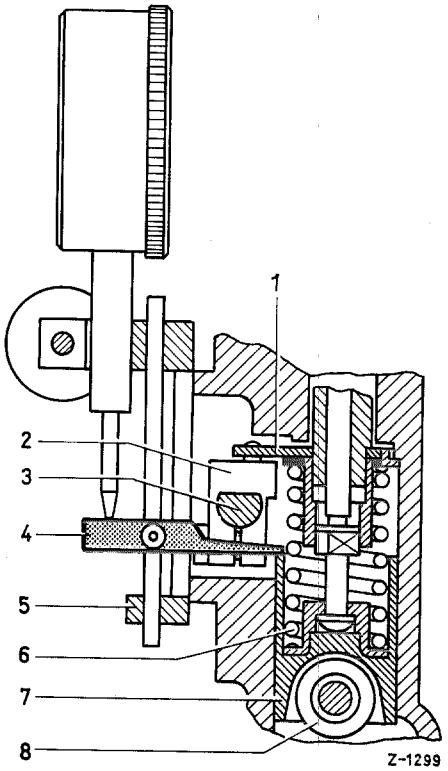

Figure 07–5/6a

1 Lever arm with pin and control sleeve
2 Clamping piece with guide groove
3 Control rod
4 Feeler of measuring device
5 Feed begin (stroke advance) measuring device EFEP 303, part No. 000 589 85 21
6 Tappet spring
7 Tappet sleeve
8 Tappet roller

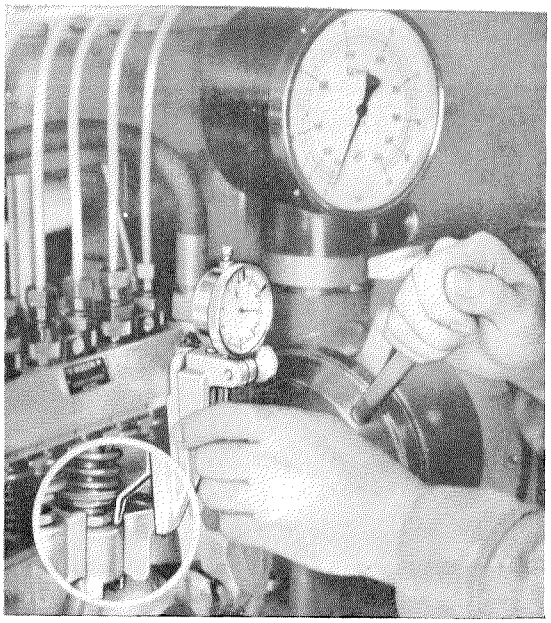

Figure 07–5/6b

1 Roller tappet
2 Measuring device EFEP 51

2. **Checking Feed Beginning**

Open bleeder screw (1) on nozzle holder (see Figure 07–5/3).

Put the change-over tap (2) in position A, feed beginning test (vertical), and set by hand the pump plunger next to the drive to BDC and the control rod to middle position (see Figure 07–5/3).

Operate the test stand until the test oil flows over at the nozzle holder. Close the cock of the reservoir only if absolutely necessary.

Move the control sleeve lever arm forward or set the control rod to 'VOLL' (full).

Turn by hand and with spike the pump in direction of rotation until the test oil is just stopping to flow out of the nozzle holder.

The needle (8) at the graduation scale (see Figure 07–5/3) must now again point to the value determined with the measuring device (Figure 07–5/6 and 07–5/6b). If this test does not show the same result as determined during stroke advance adjusting, it is necessary for the **OM 636,** i.e., with the 'A' pump to re-set the tappet screw and for the **OM 621,** i.e., with the 'M' pump to exchange the roller of the roller tappet.

If the feed begin of pump 'A' is too early, the adjusting screw in the roller tappet must be screwed in; if the feed beginning comes too late, the adjusting screw in the roller tappet must be unscrewed (Figure 07–5/8). $^1/_6$ turn = approx. 1 deg change at the graduation scale.

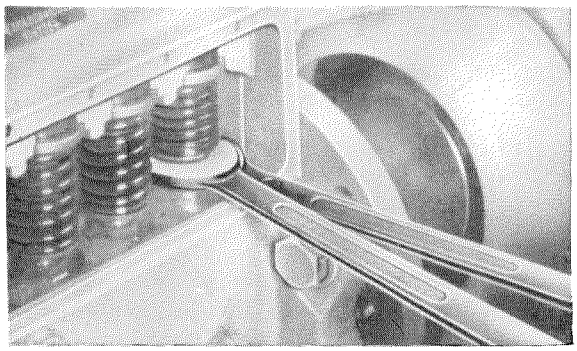

Figure 07–5/8

After every adjusting securely tighten the lock nut on the tappet screw, then repeat measuring.

Should the values on the **'M'** pump depart, it is not necessary to immediately replace the roller of the checked cylinder, but rather mark the measured departure (e.g. + 2° or —1°) with a pencil on the cover fit and then check the cam offsetting or carry through the feed begin check of the other elements. This spares the procedure of removing the camshaft and the roller tappets.

3. **Checking Feed Beginning of the other Elements**

A. OM 636

The feed beginning of the other elements is adjusted in the same way by referring to the cylinder already adjusted. The camshaft must therefore be turned in steps of 90 deg according to the arrangement of the cams. The permissible tolerance is ± 0.5 deg.

Checking Distance between Pump Plunger and Pressure Valve at TDC.

After checking feed begin check all pump plungers again in highest cam position (top dead center) to insure that they still have a clearance (safety clearance) of at least 0.3 mm. This distance is also measured with the measuring device EFEP 51 (see Figure 07–5/6b). Mount the measuring device and engage with the respective roller tappet. Turn camshaft of pump in direction of rotation, so that the roller tappet and the pump plunger are in top dead center; this position can easily be determined with the measuring device (dial gauge). Adjust dial gauge to zero. The roller tappet is now lifted with a screwdriver held between adjusting screw and lock nut and the travel is observed at the dial gauge. If the travel is less than 0.3 mm, the respective tappet must be re-adjusted. Adhering to this travel (safety clearance) is very important, because otherwise the plunger lugs could knock against the plunger sleeve and destroy the pump.

Note: If a tappet had to be adjusted, check the feed beginning of all elements according to Pos. 2 and Pos. 3, correct if necessary.

B. OM 621

After checking or adjusting resp. of the element next to the drive, go on turning and check the feed begin of the individual elements in accordance with the cam order (1-3-4-2).

Note: With the **'M'** pump, a further turning of the camshaft to the next desired cam position is not possible, because the feeler (4) of the measuring device strikes the control rod (3) (see Figure 07–5/6a). Therefore, dismount the measuring device (5) before turning and re-mount for measuring the following element.

Cam offsetting: 90°±0.5; before checking each element, open the respective overflow pipe on the nozzle holder and close again after checking.

Possible departures from the specified value should be marked with a pencil on the rim of the cover fit at the respective element (e.g. +2° or —1°). If the element next to the drive (1st cylinder) has also to be adjusted, do not fail to take this value into consideration. Remove the injection pump from the test stand and dismount camshaft as well as roller tappet. Install new rollers into the tappets in accordance with the departure. The offset measure should be adhered to if possible without any tolerance. Optionally, there are 5 rollers available, viz. with the diameters of 15.30 mm; 15.15 mm; 15.00 mm; 14.85 mm and 14.70 mm (**0.3 mm roller diameter correspond to an offsetting of 1°**). Again install roller tappets and camshaft, again take pump on test stand and re-check offsetting or feed begin of all elements. If the offsetting is correct, dismound camshaft again and apply sealing compound Kk 68 v 1 to the bearing cover and sealing surface. Now, finally install camshaft including bearing cover and firmly tighten the mounting screws. Do not forget the lock washers.