SERVICE MANUAL

VOLVO 164 1971

GROUP 34

IGNITION SYSTEM

DESCRIPTION

The ignition system is of the battery ignition type. It consists of the following main parts:
Ignition coil with advance engaging resistor, distributor, ignition leads and spark plugs.

IGNITION COIL

The ignition coil and advance engaging resistor are fitted on the bulkhead, see Fig. 3-46. In order to make sure that a completely satisfactory spark is obtained at high speeds, an ignition coil is fitted which is designed for a voltage lower than 12 volts. An advance engaging resistor is connected in series with the ignition coil for the purpose of lowering the voltage to the right value.
In order to raise the ignition voltage at the moment starting takes place, the advance engaging resistor is by-passed when the starter motor is engaged. The ignition coil is activated directly by the battery voltage via a contact on the starter motor (see wiring diagram). The advance engaging resistance has a resistance of 0.9 ohm.

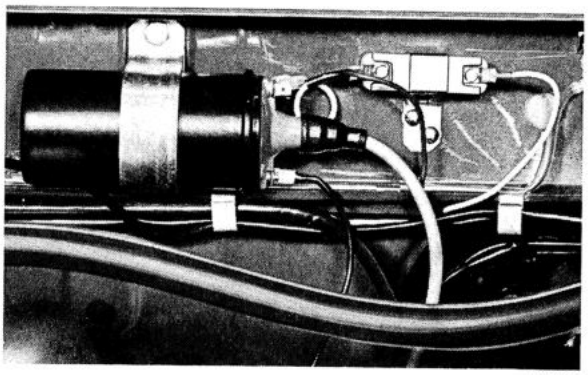

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Fig. 3-46. Ignition coil and advance engaging resistor

DISTRIBUTOR

The distributor is mounted on the left-hand side of the engine, see Fig. 3-47, and is driven from the camshaft. The setting of the distributor in relation to engine speed is regulated by a centrifugal governor fitted under the breaker plate. Adjustment in relation to loading is controlled by a vacuum regulator mounted outside the distributor (4, Fig. 3-47).
The vacuum regulator has two diaphragms and is constructed so that during engine braking or idling it lowers the firing during the basic adjustment. When engine braking or idling takes place, the throttles in the carburettors are closed so that there is no vacuum in the connection from the carburettors (5, Fig. 3-49) so that the return spring (6) presses back the primary diaphragm (7) against the stop (8). The pull rod (2) which is secured to the primary diaphragm (7) transmits the movements in the diaphragm to the breaker plate. If the vacuum in the connection from the intake manifold (3) is sufficiently large, pull the secondary diaphragm (4) from the stop (8) and this lowers the firing during the basic adjustment.
During throttling, diaphragm (7) is influenced by the vacuum in the carburettors and takes over the regulating function irrespective of the vacuum in the intake manifold.
The positive part of the vacuum regulator is not used in vehicles intended for the U.S.A. market. Only the negative part, which lowers the firing during idling, is used.

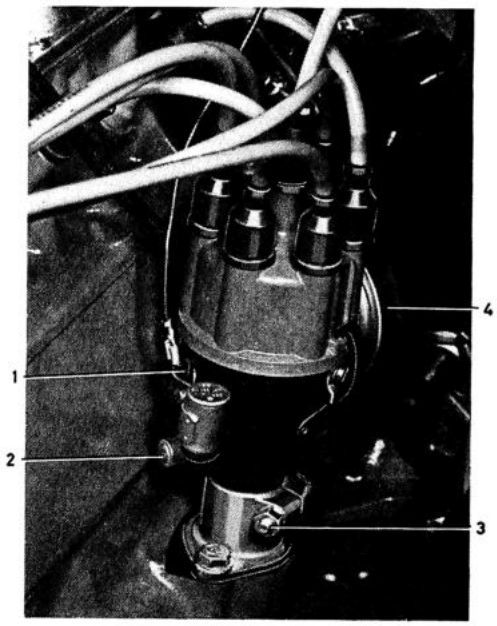

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Fig. 3-47. Distributor

1. Primary connection with capacitor
2. Lubricator
3. Attaching bolt
4. Vacuum regulator

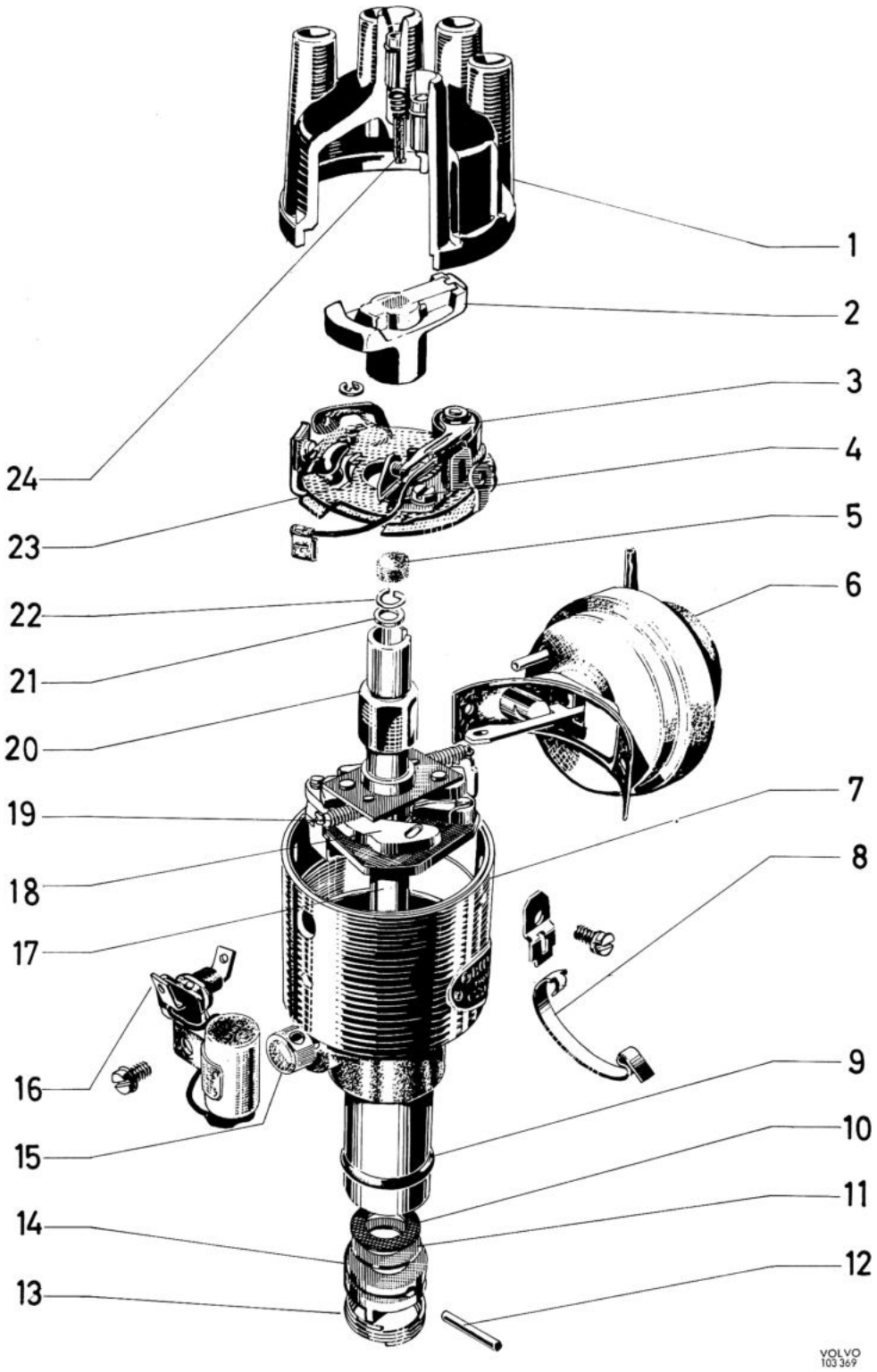

Fig. 3-48. Distributor

1. Distributor cap
2. Distributor arm
3. Contact breaker
4. Lock screw for breaker contacts
5. Lubricating felt
6. Vacuum regulator
7. Distributor housing
8. Cap clamp
9. Rubber seal
10. Fiber washer
11. Steel washer
12. Lock pin
13. Spring ring
14. Flange
15. Lubricator
16. Primary connection
17. Distributor shaft
18. Centrifugal weight
19. Centrifugal governor spring
20. Breaker cam
21. Washer
22. Snap ring
23. Breaker plate
24. Rod brush (carbon)

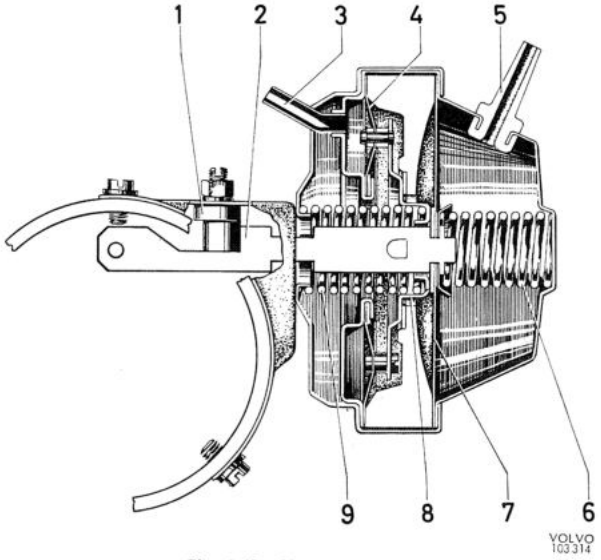

Fig. 3-49. Vacuum regulator

1. Eccentric for adjusting firing drop
2. Pull rod
3. Connection from intake manifold
4. Secondary diaphragm
5. Connection from the carburettors
6. Return spring from primary diaphragm
7. Primary diaphragm
8. Register
9. Return spring for secondary diaphragm

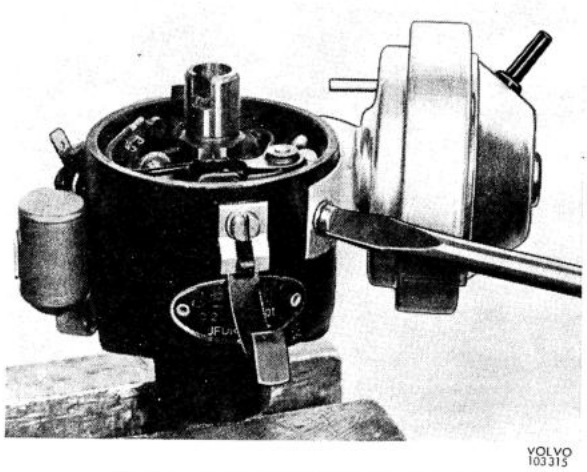

Fig. 3-50. Removing the vacuum regulator

DISTRIBUTOR

REMOVING

1. Release the lock clamps for the distributor cap and lift of the cap.
2. Remove the primary lead from the primary connection (1, Fig. 3-47).
   Remove the vacuum hoses from the vacuum regulator. (When removing the hose from the bakelite connection, observe great care not to break the connection.)
3. Slacken the screw (3, Fig. 3-47) and pull up the distributor.

DISMANTLING

1. Pull off the distributor arm.
   Remove the circlip for the pull rod from the vacuum regulator.
   Remove the vacuum regulator according to Fig. 3-50.
2. Mark up how the clamps for the cap are located and remove them.
   Disconnect the lead from the breaker contacts and remove the primary connection, Fig. 3-51.
   Lift up the breaker plate.
3. Disconnect the springs for the centrifugal governor and mark up how the breaker cam is located in relation to the distributor shaft. Secure the breaker cam in a vice with soft jaws. Carefully knock on the distributor housing with a plastic mallet (Fig. 3-52) until the snap ring (22, Fig. 3-48) has released.

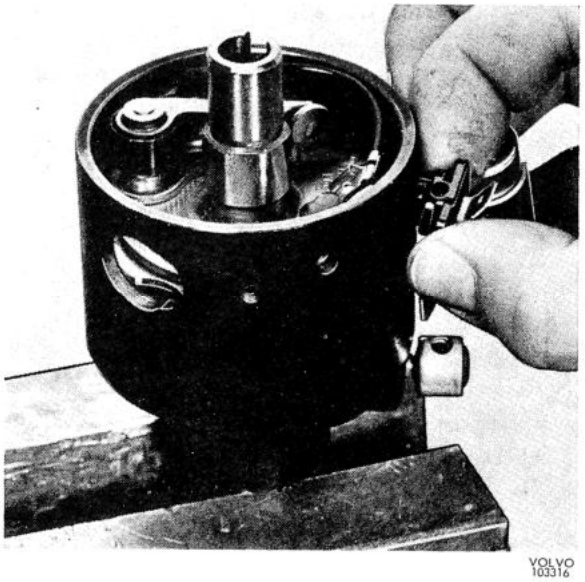

Fig. 3-51. Removing the primary connection

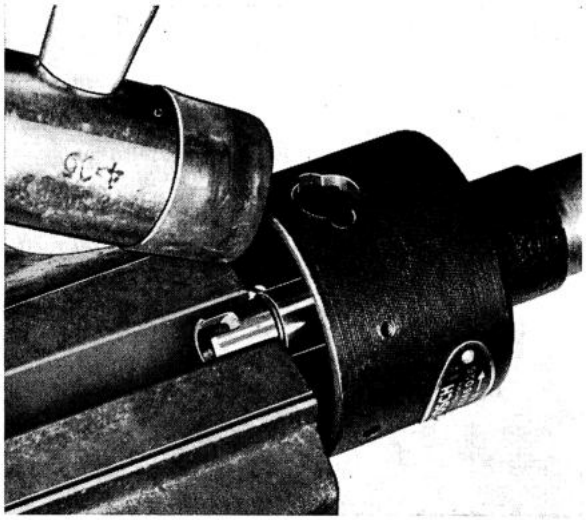

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Fig. 3-52. Removing the snap ring

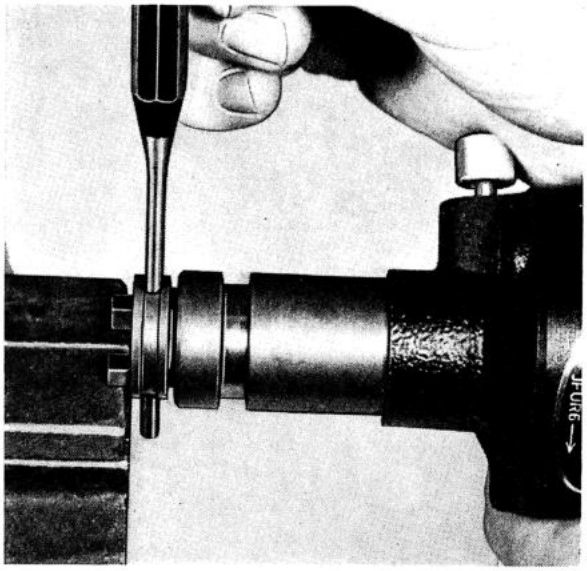

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Fig. 3-53. Removing the driving collar

4. Remove the resilient ring (13, Fig. 3-48) and mark up how the driving collar (14, Fig. 3-48) is located in relation to the distributor shaft.
   Tap out the pin (Fig. 3-53), lift off the driving collar and pull up the distributor shaft.
   Check that no washers have been lost.
5. Remove the lock springs for the centrifugal weights and lift up the weights.

INSPECTING

Distributor plate

1. The surface of the contact breaker points should be flat and smooth. The colour of the contacts should be grey. Oxidized or burnt contacts must be replaced. After a long period of use, the contact lip can be worn and the spring fatigued, so that the contacts should be replaced if the distributor for any reason is disassembled.
2. The contact plate must not be loose, worn or have burr on.

Distributor shaft

1. The play between the distributor shaft and the breaker camshaft must not exceed 0.1 mm (0.004").
2. The cams on the breaker camshaft must not be scored or worn down so that the dwell angle is altered.
3. The holes in the centrifugal weights must not be oval or deformed in any other way.
4. The centrifugal weight springs must not be deformed or damaged.

Distributor housing

1. The play between the distributor housing and the shaft should not exceed 0.2 mm (0.008"). If the play is excessive, replace the bushes and, if this is insufficient, also the shaft.

ASSEMBLING

1. Lubricate the distributor parts according to the instructions given in Fig. 3-55.
2. Fit the centrifugal weights and also the lock springs on to the weights. Fit the breaker camshaft on to the distributor shaft. Hook on the

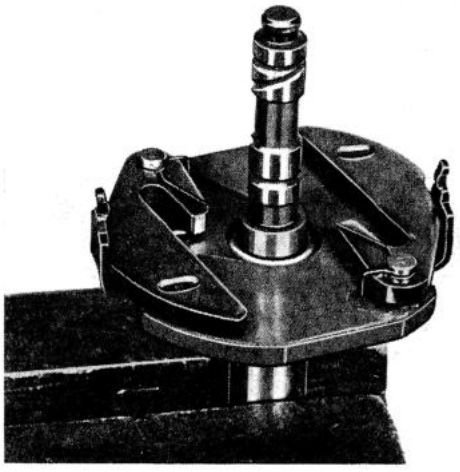

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Fig. 3-54. Distributor shaft with centrifugal weights

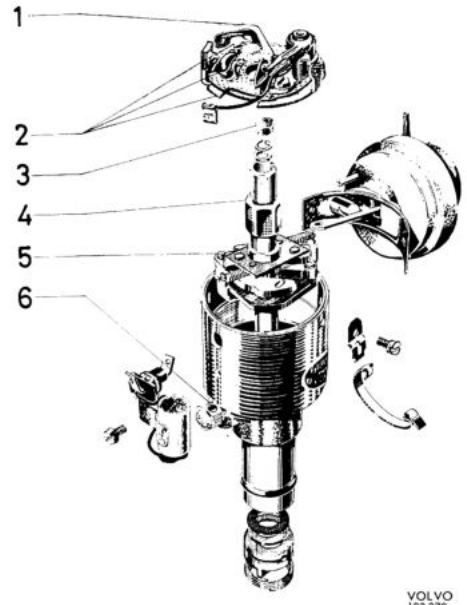

Fig. 3-55. Lubricating scheme for distributor

Use Bosch lubricant (or equivalent) according to below.

1. Ft 1 v 4. Place a little grease on the contact lip
2. Ft 1 v 26. Grease
3. Ol 1 v 13. Lubricate
4. Ft 1 v 4. A very light layer of grease
5. Ft 1 v 26. Grease
6. Ol 1 v 13. Fill with oil

springs for the centrifugal governor. Fit the washer and circlip for the breaker camshaft. The circlip is placed into position by means of a suitable sleeve. Fit the lubricating felt.

3. Fit the distributor shaft in the distributor housing and install the driving collar on the distributor shaft. Make sure that the fibre washers come against the distributor housing. Fit the pin in the collar and check the axial clearance on the distributor shaft. The clearance should be 0.1—0.25 mm (0.004—0.010"). Any adjustment can be done by altering the number of adjusting washers on the distributor shaft.
   Fit the resilient ring on to the driving collar.
4. Fit the breaker plate. Fit the lock clamps for the cap. Fit the primary connection and connect the lead from the breaker contacts.
5. Fit the vacuum regulator and connect the pull rod to the breaker plate.
6. Check that the breaker contacts are mounted correctly both horizontally and vertically. Adjustment should be made with a suitable tool, (for example, Bosch EFAW 57 A), but only the fixed contact may be bent. Wash the contacts with trichlorethylene or chemically pure gasoline.
   Run the distributor on a test bench and check according to the "Specifications".

REPLACING THE CONTACT BREAKER

The contact breaker can be replaced with the distributor fitted, but it **should** be done with the distributor dismantled.

1. Remove the distributor rotor arm.
2. Disconnect the electric lead at the primary connection.
3. Remove the screw for the contact breaker and lift up the old contacts.
4. Lubricate the distributor according to the instructions given in Fig. 3-55.
5. Fit the new contact breaker.
6. Connect the electric cable at the primary connection.
7. Check that the contact breaker is located correctly both vertically and horizontally.
   Adjustment should be made with a suitable tool, (for example, Bosch EFAW 57 A), but only the fixed contact may be bent. Wash the breaker contacts with trichlorethylene or chemically pure gasoline.
   Run the distributor on a test bench and check according to the "Specifications".

TESTING THE DISTRIBUTOR IN TEST BENCH

1. Run the distributor in its ordinary direction of rotation (anti-clockwise) and adjust the contact breaker dwell angle according to the "Specifications".
   Adjustment is done by slackening a little the screw for the breaker contacts and then inserting a screwdriver in the recess, Fig. 3-56, and turning the screwdriver until the dwell angle is the correct one.
   Then tighten the screw for the contact breaker.

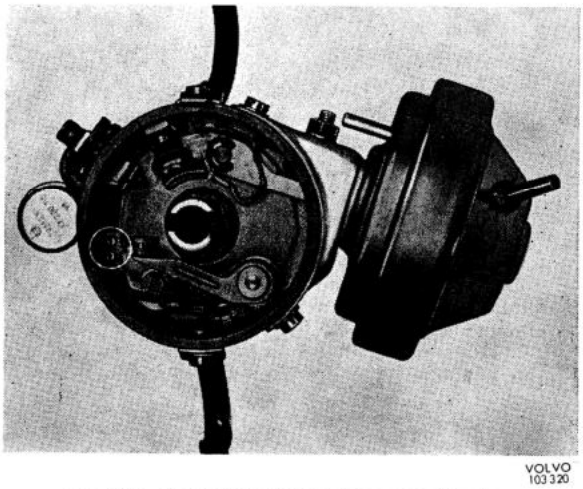

Fig. 3-56. Recess for adjusting the contact breaker

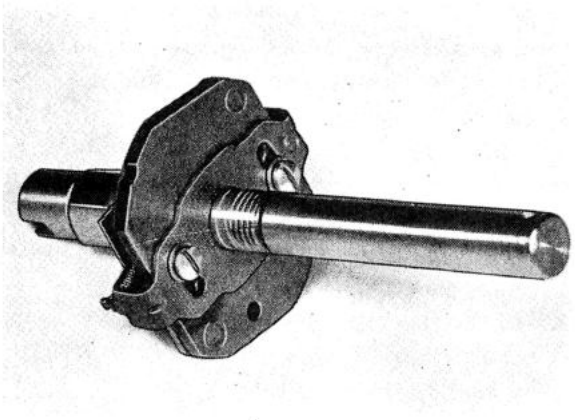

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Fig. 3-57. Driving collar for centrifugal governor

2. Run the distributor and set the protractor on the test bench so that a marking comes opposite 0° at such a low speed (below 400 distributor r.p.m.) that the centrifugal governor does not function. Increase the speed slowly and read off the values at the prescribed graduations. A newly lubricated distributor should first be run up to maximum speed several times. Permissible tolerance for the centrifugal regulator is ± 1°.
   If the centrifugal governor curve is too high or too low, this can be remedied by altering the spring tension in the centrifugal governor. To do this, the distributor must be dismantled and the distributor shaft lifted up (the breaker camshaft does not need to be removed from the distributor shaft). The screws holding the driving collar are then released, see Fig. 3-57. If the driving collar is turned in the direction of rotation, the curve rises, turning the driving collar opposite the direction of rotation will lower the curve.
   N.B. The governor curve must not be adjusted by bending the spring clamps of the driving collar.
3. Run the distributor at low speed and adjust the protractor so that a marking is obtained at 0°. Connect the vacuum hose to the bakelite connection on the vacuum regulator (the primary diaphragm). Increase the vacuum gradually and read off the values on the prescribed graduations. The difference between the rising/falling vacuum must not exceed 1½°. A certain adjustment of the max. reading can be obtained by slackening the screws for the vacuum regulator and moving the regulator.
4. Move over the vacuum hose to the metal pipe on the vacuum regulator (the secondary diaphragm) and check that the ignition drop mechanism is functioning satisfactorily. If the max. drop is too great or too small, it can be adjusted by slackening the counternut and by turning the eccentric, see Fig. 3-58.

FITTING

1. Place the distributor in position.
2. Press the distributor downwards while turning the distributor arm at the same time. When the distributor goes down about 5 mm (3/16") and it is no longer possible to turn the distributor arm, the driving collar of the distributor is then in the slot on the distributor drive.
3. Turn the distributor housing so that it takes up the same position it had before removal.
4. Connect the primary lead. Fit on the distributor cap.
5. Start the engine and set the ignition. (If the engine does not start, turn the distributor housing until it does so.)

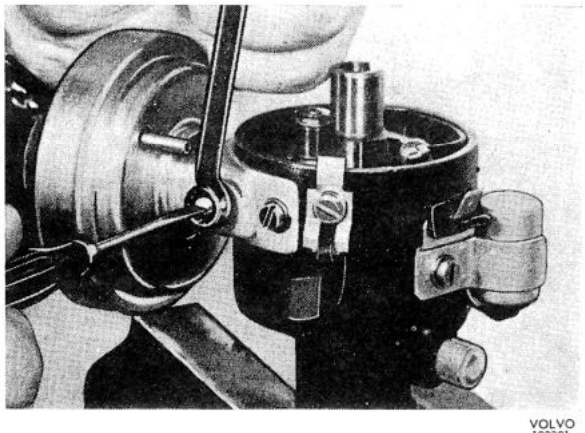

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Fig. 3-58. Eccentric for adjusting max. ignition drop

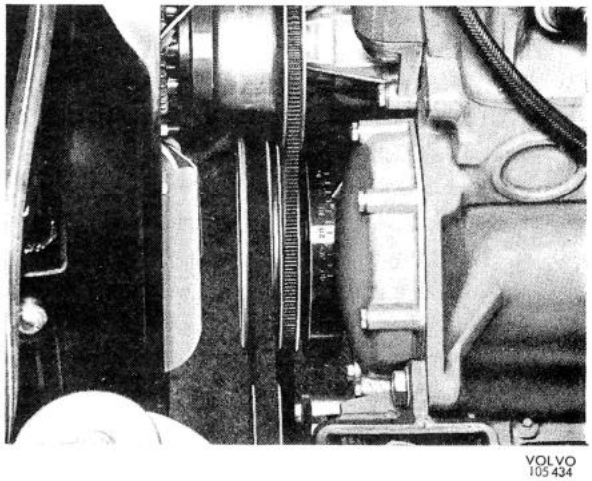

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Fig. 3-59. Flywheel damper with graduation for ignition setting

IGNITION SETTING

Ignition setting should always be carried out while the engine is running and with the help of a Stroboscope.

1. Clean the flywheel damper so that the graduation marks are visible, see Fig. 3-59.
2. Remove the hoses from the vacuum regulator. (The hose for the intake manifold should be shut off by, for example, bending it or by sealing it with a suitable plug, so that the engine does not draw in unwanted air.)
3. Connect the Stroboscope to No. 1 cylinder spark plug and to the battery.
4. Start the engine and run it at the r.p.m. given in the "Specifications". Use a tachometer for this purpose. Point the ignition setting lamp at the graduation on the flywheel damper. Slacken the distributor (3, Fig. 3-47) and turn it until the firing position agrees with that given in the "Specifications". Tighten securely the distributor and check that the firing position and speed has not been altered.
5. Remove the Stroboscope and re-fit the hoses on the vacuum regulator.