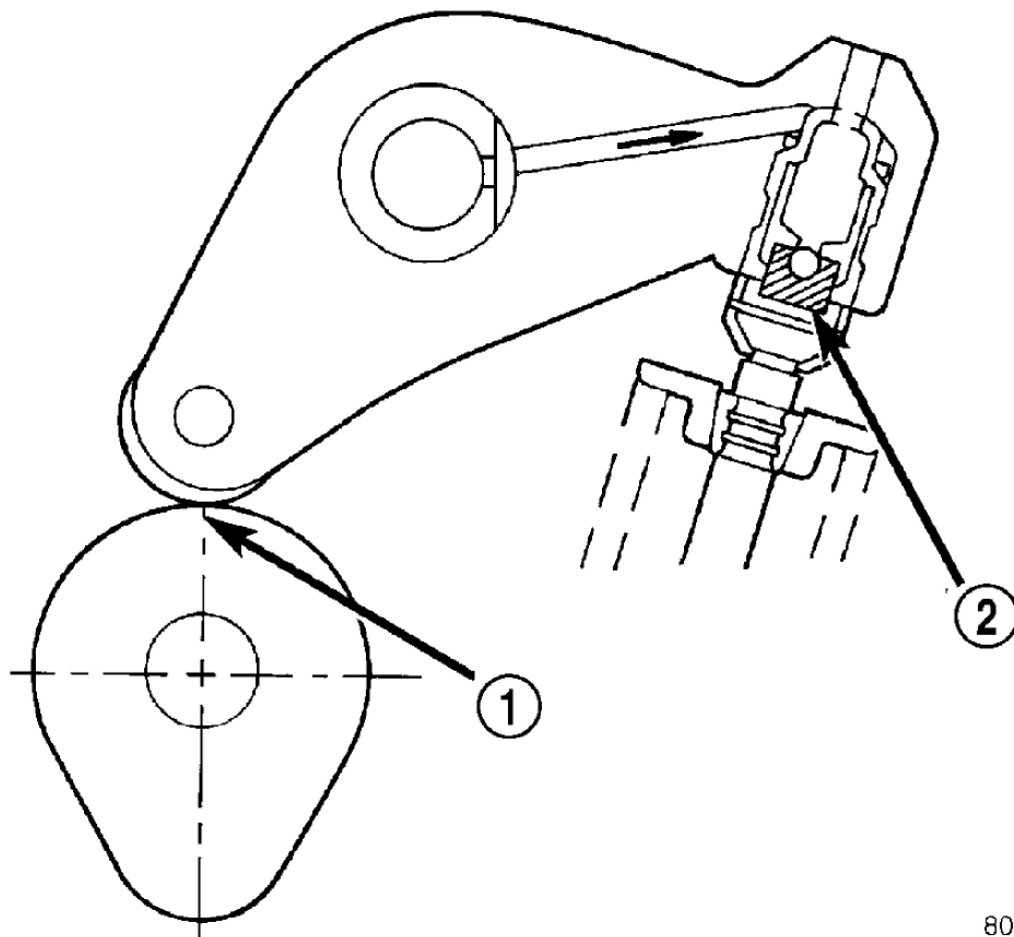


STANDARD PROCEDURE**STANDARD PROCEDURE - HYDRAULIC LASH ADJUSTER BLEEDING**

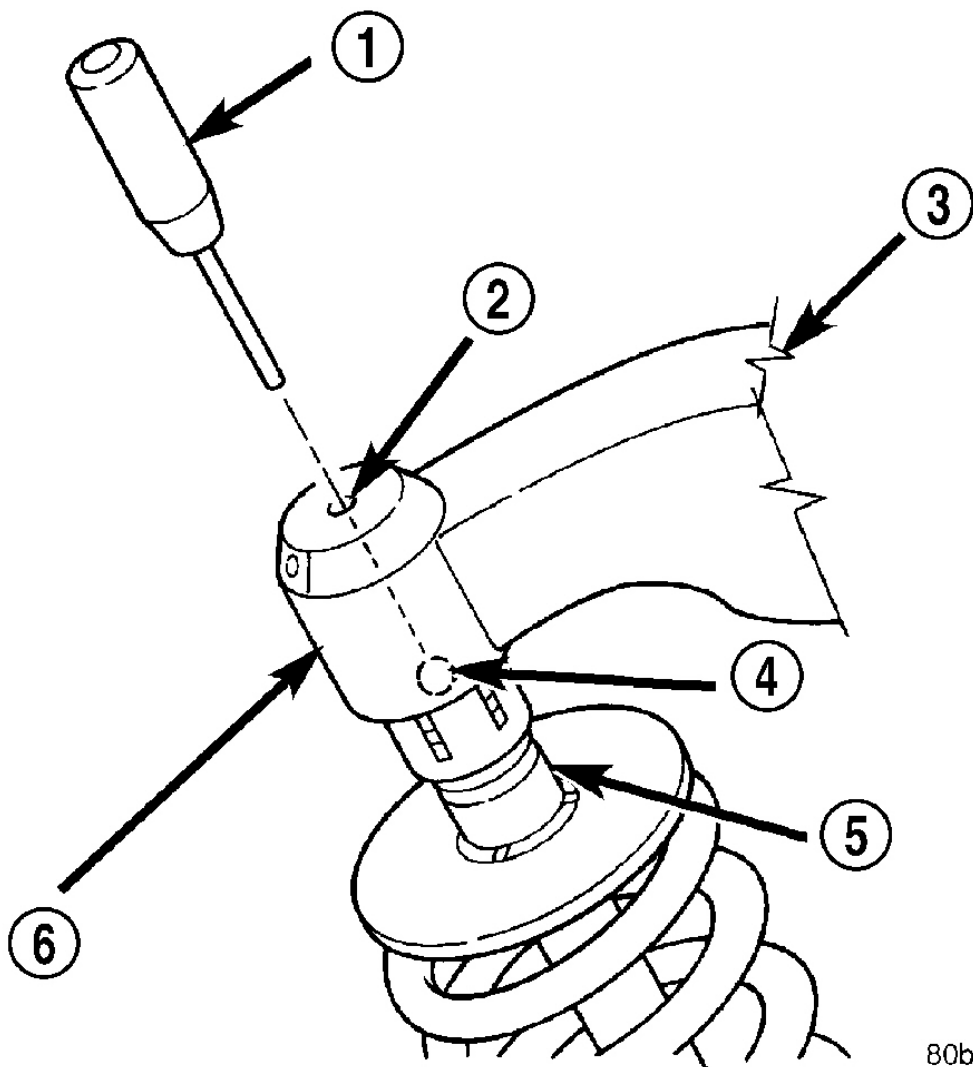
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Fig. 147: Rocker Arm Positioned On Base Circle Of Camshaft
Courtesy of DAIMLERCHRYSLER CORP.

- | |
|---------------------------|
| 1 - CAMSHAFT BASE CIRCLE |
| 2 - HIGH-PRESSURE CHAMBER |

Use this procedure to manually bleed aerated oil from the lash adjuster and remove sponginess.

1. Run the engine, bringing it to operating temperature in order to freshly pressurize and warm the valvetrain system oil supply.
2. Remove cylinder head cover(s).
3. Ensure the rocker arm is positioned on the base circle (1) of the cam. See **Fig. 147**. Rotate engine as necessary.



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Fig. 148: Purging Air From Lash Adjuster
 Courtesy of DAIMLERCHRYSLER CORP.

- 1 - SPECIAL TOOL 8351
- 2 - OIL AIR RELIEF SERVICE ACCESS HOLE
- 3 - ROCKER ARM ASSEMBLY
- 4 - INTERNAL CHECK BALL
- 5 - VALVE TIP
- 6 - HYDRAULIC LASH ADJUSTER WITHIN ROCKER ARM

4. For intake rocker arm positions:

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- Adjust Special Tool 8351 (1) Release Probe's gauge pin to extend approximately 20 mm (0.787 in.). Then, carefully insert the release probe gauge pin into the lash adjuster (6) service access hole (2). See [Fig. 148](#).

CAUTION: If probe tip (1) breaks off within the lash adjuster (6), replace the affected rocker arm (3).

- Gently unseat lash adjuster's internal check ball (4).
 - While the internal check ball (4) is held unseated, press the rocker arm (3) into the valve tip (5), allowing the lash adjuster (6) to fully collapse. Hold this fully collapsed position for about one second, or longer.
 - Slowly release the rocker arm (3), thereby allowing the lash adjuster (6) to extend, which in turn refills the high pressure chamber with non-aerated oil.
 - Remove probe to allow check ball (4) to seat.
 - Recheck for sponginess. If the lash adjuster (6) sponginess is not completely or nearly eliminated, then repeat procedure.
 - If the spongy condition cannot be removed, replace effected rocker arm(s) (3).
5. For exhaust rocker arm (3) positions:
- Adjust Special Tool 8351 (1) Release Probe gauge pin to extend approximately 20 mm (0.787 in.). Then, using two release probes, carefully insert gauge pins into the lash adjuster service access holes. See [Fig. 148](#).

CAUTION: If probe tip (1) breaks off within the lash adjuster (6), replace the affected rocker arm (3).

- Gently unseat BOTH lash adjuster's internal check ball (4) at the same time.
 - While the internal check ball (4) is held unseated, press the rocker arm (6) into the valve tip, allowing the lash adjuster to fully collapse. Hold this fully collapsed position for about one second, or longer.
 - Slowly release the rocker arm (3), thereby allowing the lash adjuster (6) to extend, which in turn refills the high pressure chamber with non-aerated oil.
 - Remove probes (1) to allow check balls (4) to seat.
 - Recheck for sponginess. If the lash adjuster (6) sponginess is not completely or nearly eliminated, then repeat procedure.
 - If the spongy condition cannot be removed, replace effected rocker arm(s) (3).
6. Install cylinder head cover(s).

REMOVAL

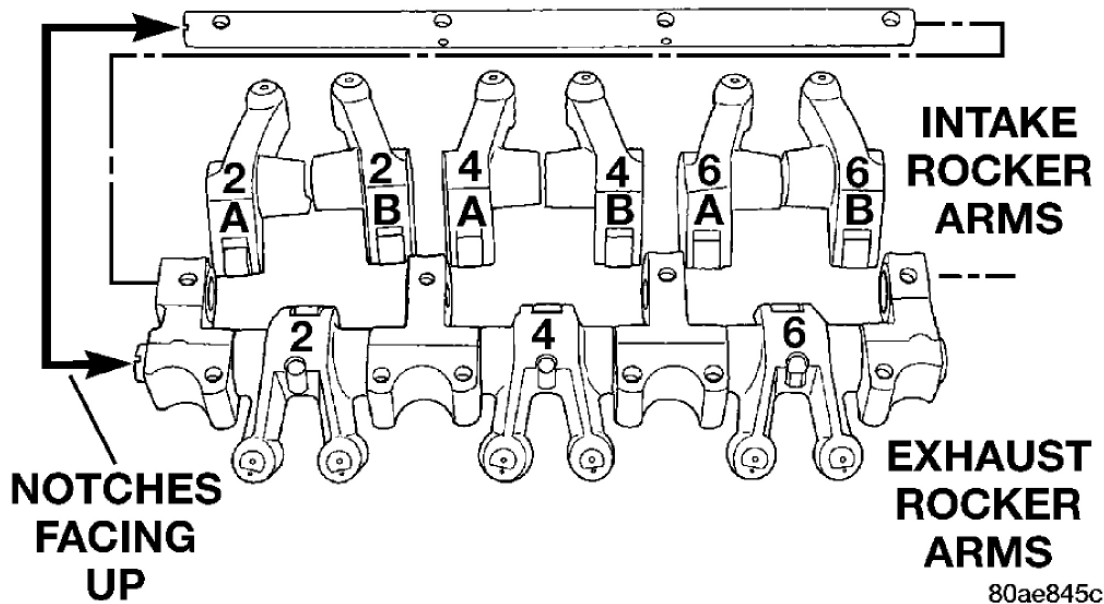


Fig. 149: Rocker Arms and Shafts
 Courtesy of DAIMLERCHRYSLER CORP.

CAUTION: The rocker arm shafts are hollow and are used as lubrication oil passages. The rocker arm and shaft assembly on the **RIGHT** side of the engine has an oil passage hole from the cylinder head to the third rocker shaft support. The rocker arm shaft assembly on the **LEFT** side of the engine has an oil passage hole from the cylinder head to the second rocker shaft support.

1. Remove cylinder head covers. (Refer to **COVER CYLINDER HEAD - LEFT** and **COVER CYLINDER HEAD - RIGHT**)
2. Identify the rocker arm assembly and rocker arms before disassembly. See [Fig. 149](#).
3. Remove rocker arm assembly bolts.
4. Remove rocker arm assembly.

NOTE: To prevent air ingestion into lash adjusters, avoid turning rocker arm assembly upside down.

CAUTION: Do not allow rocker arm assembly to rest on lash adjusters, as damage may occur to lash adjusters and/or plastic retainers.

DISASSEMBLY

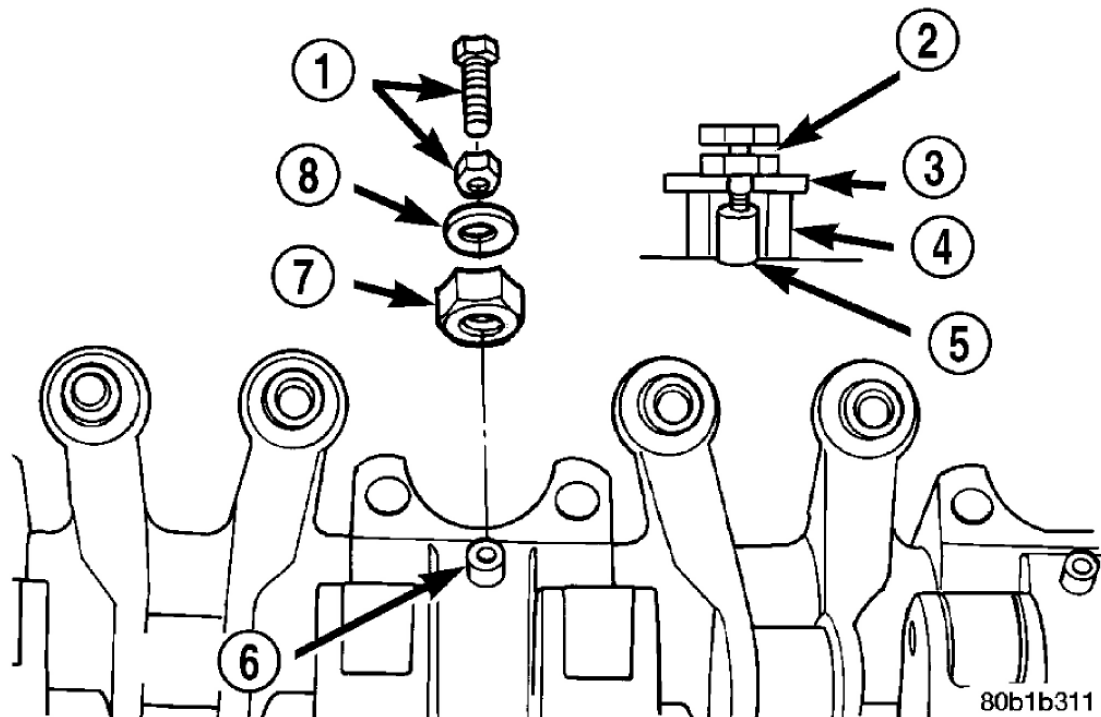


Fig. 150: Rocker Arms and Shaft - Disassembly
 Courtesy of DAIMLERCHRYSLER CORP.

- 1 - 4mm SCREW AND NUT
- 2 - 4mm SCREW AND NUT
- 3 - WASHER
- 4 - SPACER
- 5 - DOWEL
- 6 - DOWEL
- 7 - SPACER
- 8 - WASHER

1. Remove rocker arm and shafts. (Refer to **ROCKER ARM SHAFT/ ROCKER ARM / LASH ADJUSTER**)
2. Remove dowel pin using a 4 mm screw, nut, spacer, and washer installed into the pin. See **Fig. 150**. Thread the screw into the pin, then loosen the nut on the screw. This will pull the dowel out of the shaft support. Do not reuse dowel pins. Remove the rocker arms and pedestals in order.
3. Check the rocker arm mounting portion of the shafts for wear or damage. Replace if damaged or heavily worn.
4. Check shaft oil holes for clogging with small wire, clean as required.

INSPECTION

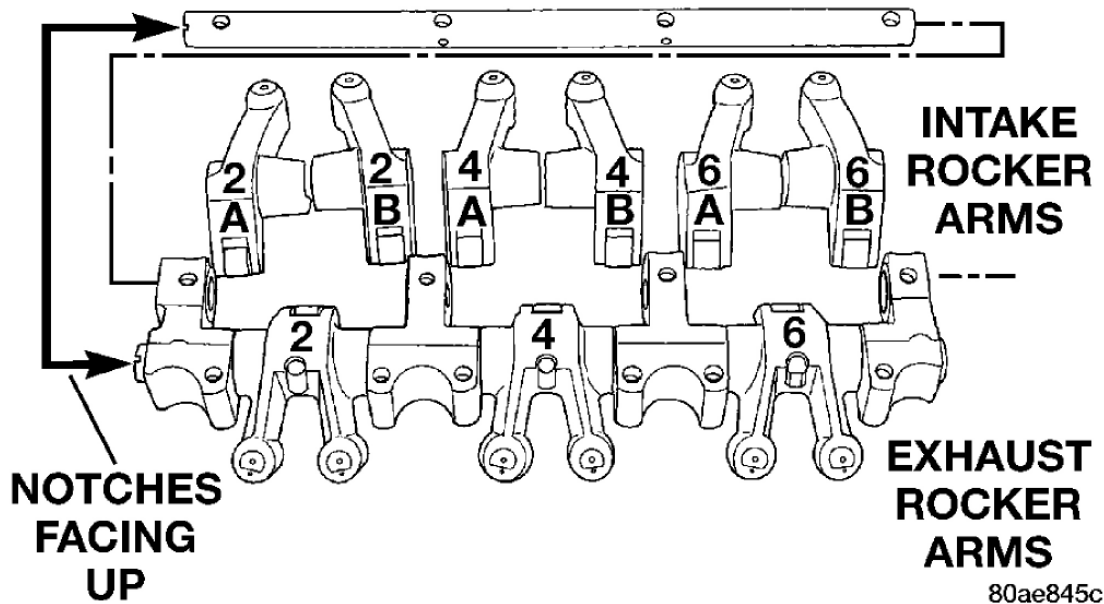


Fig. 151: Rocker Arms and Shafts
 Courtesy of DAIMLERCHRYSLER CORP.

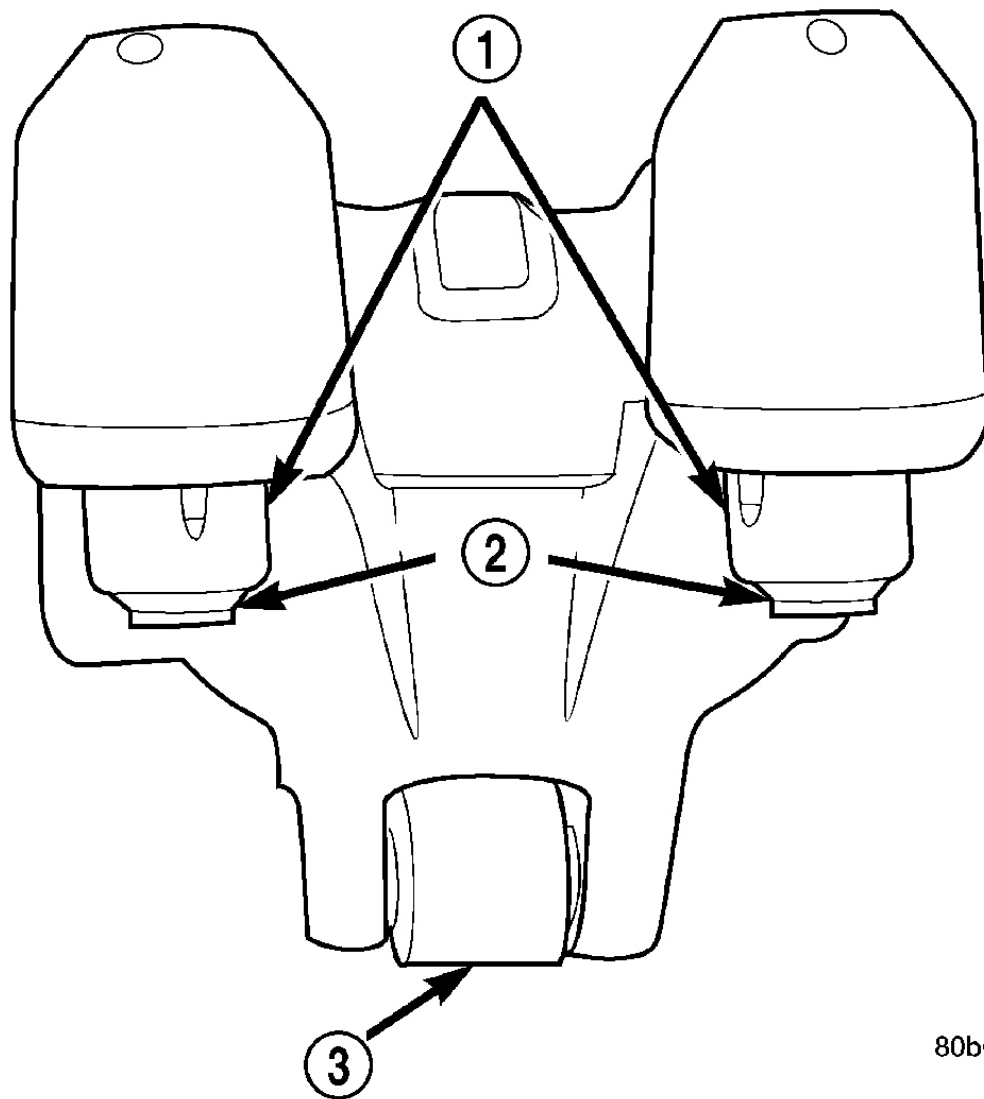
The rocker arm shafts are hollow and are used as lubrication oil ducts. The rocker arm and shaft assembly on the **right** side of the engine has an oil passage hole from the cylinder head located at the third rocker shaft support pedestal. The rocker arm and shaft assembly on the **left** side of the engine has an oil passage hole from the cylinder head located at the second rocker shaft support pedestal.

NOTE: To prevent air ingestion into lash adjusters, avoid turning rocker arm assembly upside down.

CAUTION: Do not allow rocker arm assembly to rest on lash adjusters, as damage may occur to lash adjuster and plastic retainer.

The intake and exhaust rocker arms are different. They should be identified before disassembling the assembly. See **Fig. 151**.

**HYDRAULIC LASH
ADJUSTER:**



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Fig. 152: Rocker Arm Assembly
Courtesy of DAIMLERCHRYSLER CORP.

- 1 - RETAINER
- 2 - SWIVEL PAD
- 3 - ROLLER

Check rocker arms for wear or damage. See **Fig. 152:**

Roller scuffing or wear
 Shaft bore scuffing or wear
 Swivel pad on lash adjuster missing or broken
 Rocker arm showing signs of fatigue or cracking
 Roller axle protruding from arm

Replace assembly as necessary if any rocker arms shows signs of wear.

CAUTION: Do Not remove lash adjuster from rocker arm assembly. Damage to the adjuster and rocker arm will result.

ASSEMBLY

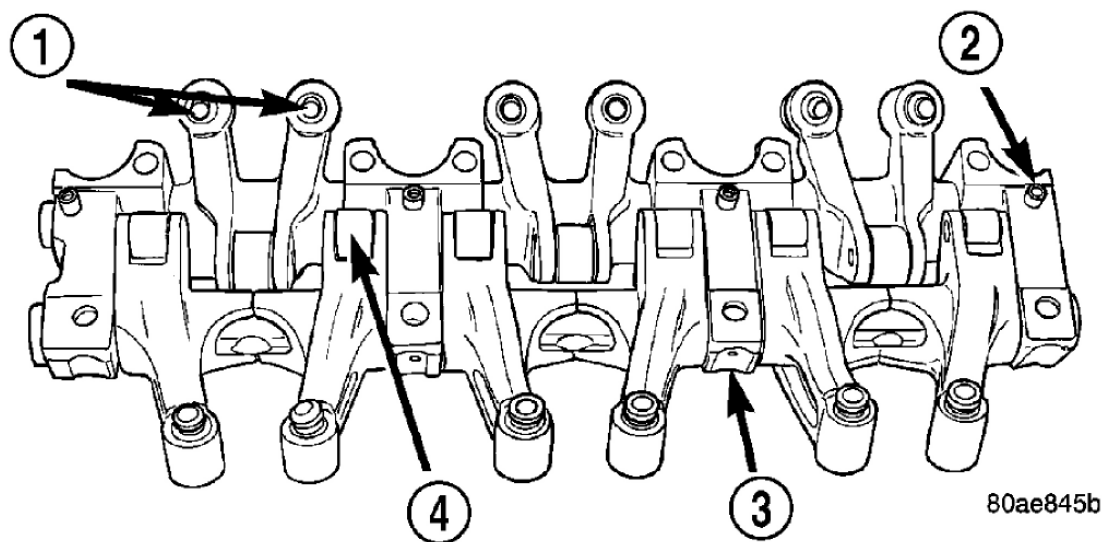


Fig. 153: Assemble Rocker Arms and Shaft
 Courtesy of DAIMLERCHRYSLER CORP.

- | |
|---|
| 1 - HYDRAULIC LASH ADJUSTERS
2 - DOWEL PIN
3 - PEDESTAL
4 - ROLLER |
|---|

CAUTION: New dowel pins must be installed when reassembling.

1. Install the rocker arms, and pedestals (3) onto the shaft.
2. Install dowel pins (2). See **Fig. 153**. Dowel pins (2) pass through the pedestal (3) into the exhaust rocker

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shafts. Dowel pins (2) should be pressed in until they bottom-out against the rocker shaft in the pedestal (3).

3. Install rocker arm and shafts. (Refer to **ROCKER ARM SHAFT/ROCKER ARM/LASH ADJUSTER**)

INSTALLATION

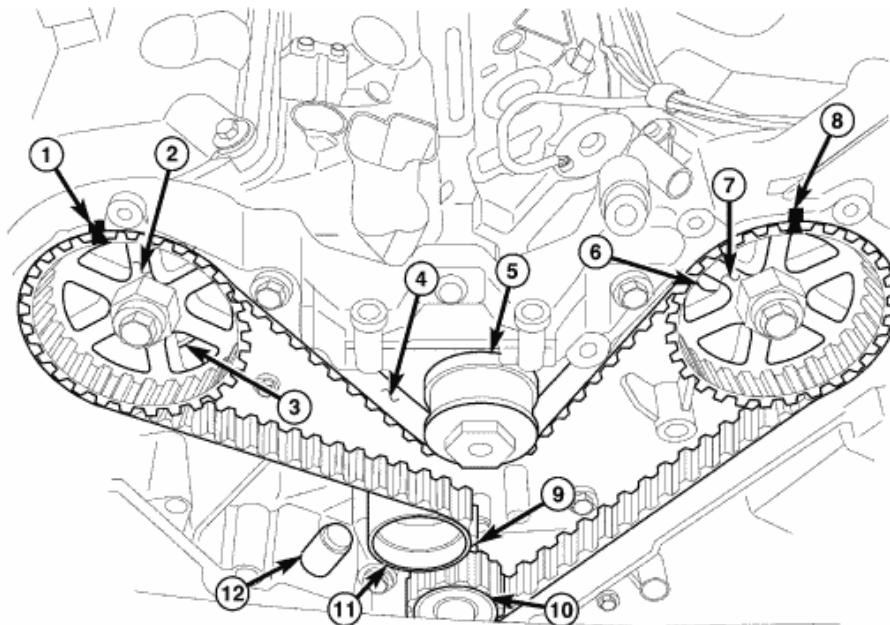


Fig. 154: TIMING GEAR ALIGNMENT
 Courtesy of DAIMLERCHRYSLER CORP.

1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK	7 - LEFT CAMSHAFT GEAR
2 - RIGHT CAMSHAFT GEAR	8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK
3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT	9 - CRANKSHAFT GEAR ALIGNMENT MARK
4 - TIMING BELT	10 - CRANKSHAFT GEAR
5 - WATER PUMP PULLEY	11 - TIMING BELT TENSIONER PULLEY
6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT	12 - TIMING BELT TENSIONER

NOTE: Rocker arm and shaft assembly can be installed either prior to or after (preferred) cylinder head installation.

1. Rotate camshaft gears to the position shown (1,8,9) in. See [Fig. 154](#). With the camshaft gears in these positions the lobes are in a neutral position (no load to the valve). This will allow the rocker arm shaft assembly to be tightened into position with little or no valve spring load on it.

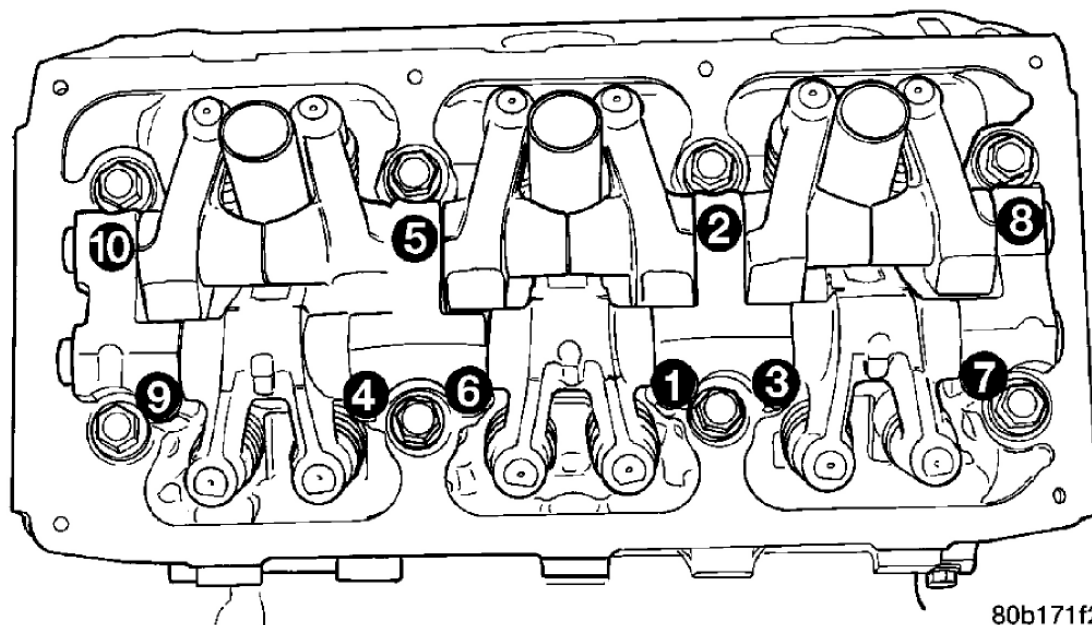


Fig. 155: ROCKER ARM AND CAMSHAFT ASSEMBLY

Courtesy of DAIMLERCHRYSLER CORP.

2. Install the rocker arm and shaft assembly making sure that the identification marks face toward the front of engine for left head and toward the rear of the engine for right head.
3. Tighten rocker arm/shaft assembly bolts in sequence to 31 N.m (275 in. lbs.). See [Fig. 155](#).
4. Install cylinder head covers (Refer to [COVER CYLINDER HEAD - LEFT](#) and [COVER CYLINDER HEAD - RIGHT](#)).