

Product: WHEEL DOZER

Model: 824C WHEEL DOZER 85X

Configuration: 824C TRACTOR 85X00001-01193 (MACHINE) POWERED BY 3406 ENGINE

Disassembly and Assembly 3406E and 3456 Engines for Caterpillar Built Machines

Media Number -REN1364-06

Publication Date -01/05/2008

Date Updated -20/05/2008

i02110801

Camshaft - Remove

SMCS - 1210-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-7257	Cradle	1
B	9U-7256	Guide	1
C	9U-7225	Camshaft Pilot	2
D	9U-7240	Camshaft Hook	2

Start By:

- Remove the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".
- Remove the rocker arms and the rocker shafts. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

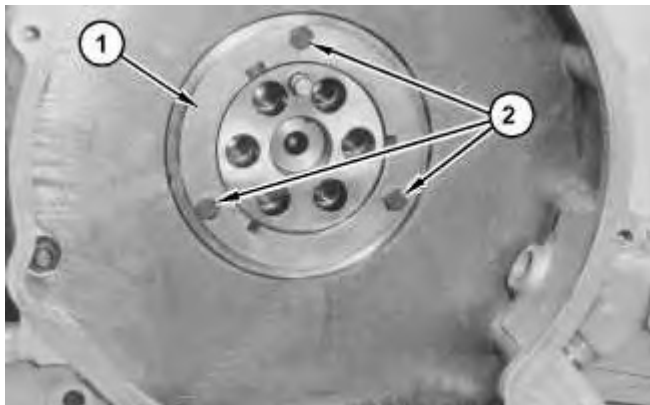


Illustration 1

g01028806

NOTICE

Do not turn the crankshaft or the camshaft while the camshaft gear is removed. If the front gear group is not correctly timed during installation, interference can occur between the pistons and the valves, resulting in damage to the engine.

1. Remove bolts (2) and thrust plate (1) .
-

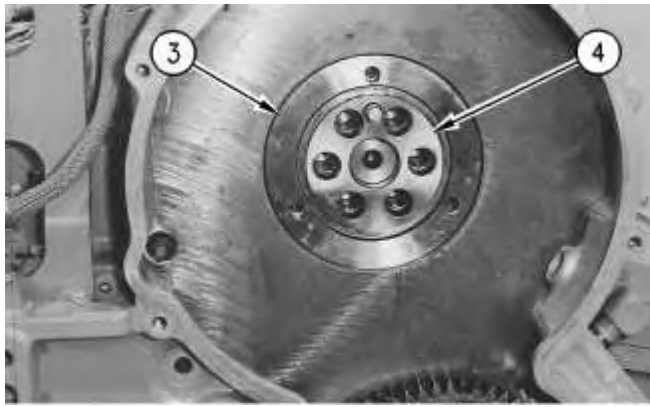


Illustration 2

g00576209

2. Remove seal assembly (3) and adapter (4) .

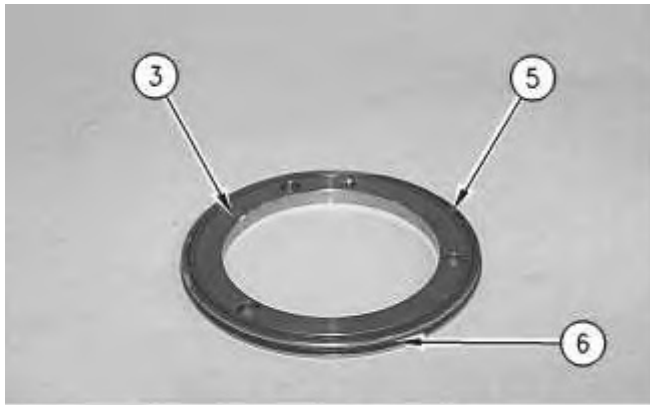


Illustration 3

g00576240

3. Remove O-ring seals (5) and (6) from seal assembly (3) .

NOTICE

Care must be used when removing the camshaft to not damage the highly finished surfaces of both the camshaft and camshaft bearings

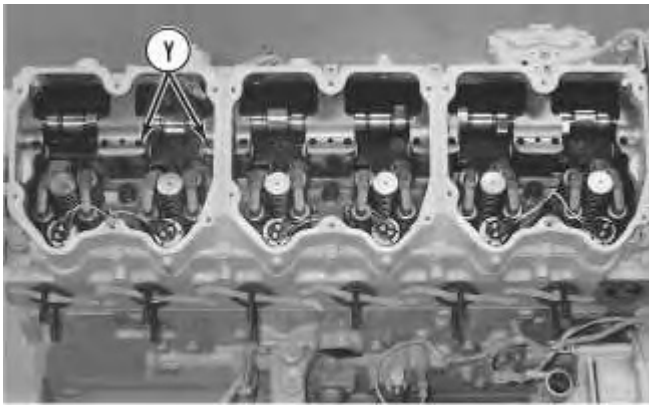


Illustration 4

g00509797

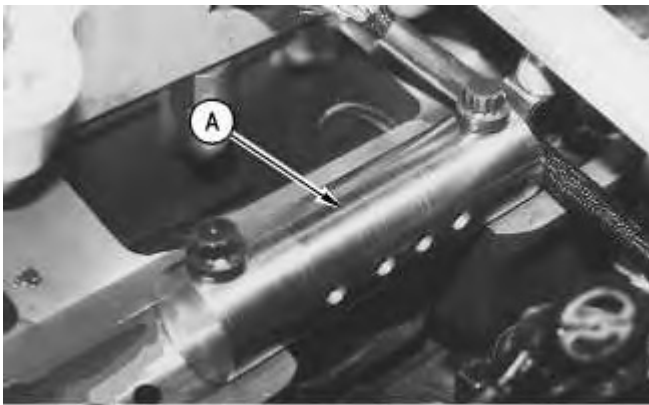


Illustration 5

g00581441

4. Use the bolts for the rocker arm shaft assembly to install Tooling (A) at Location (Y) .

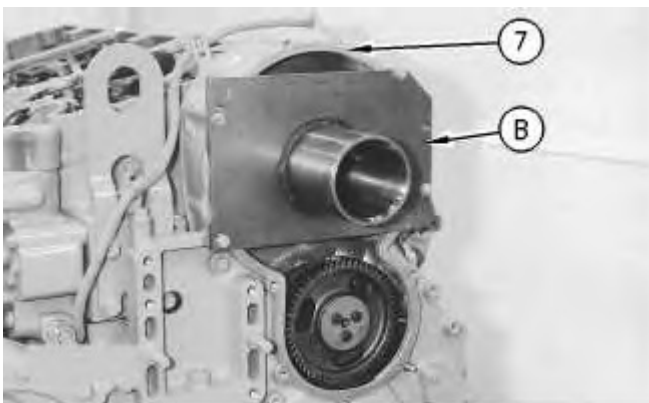


Illustration 6

g00581442

5. Install Tooling (B) on front housing (7). Do not tighten the bolts for Tooling (B) at this time.

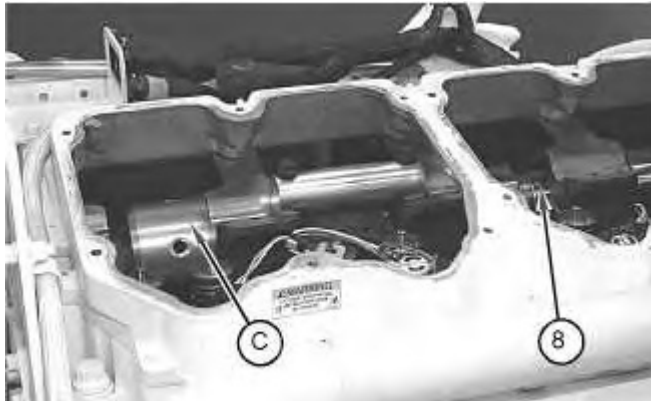


Illustration 7

g01074729

Note: It is necessary to install Tooling (C) on the camshaft. Tooling (C) will support the rear of camshaft (8) as the camshaft is moved out of the cylinder head and into Tooling (B) .

6. Move camshaft (8) forward and install one Tooling (C) in the end of camshaft (8). Again, move the camshaft forward and install remaining Tooling (C) into the back of first Tooling (C) .
7. Position camshaft (8) into the bore of Tooling (B). Tighten the bolts that hold Tooling (B) to the front housing.

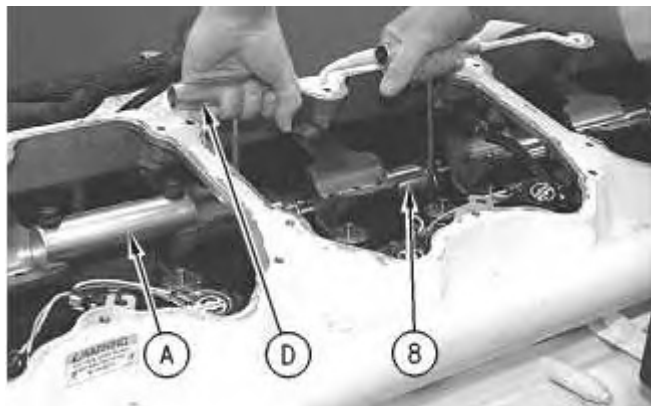


Illustration 8

g00581444

Note: Avoid lifting camshaft (8) with Tooling (D). The camshaft should rest on Tooling (A). Lifting of the camshaft can cause misalignment as the camshaft is removed, resulting in damage to the camshaft bearings.

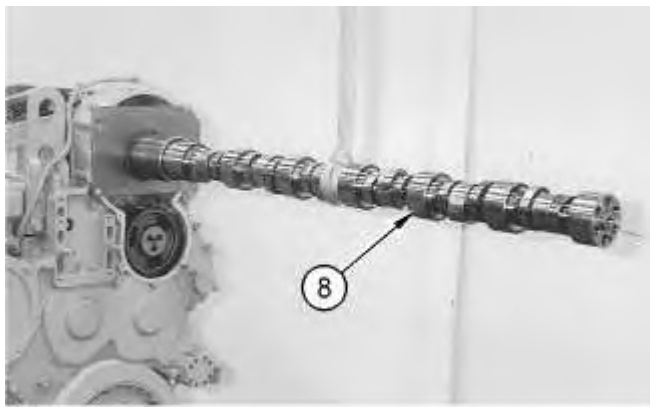


Illustration 9

g00581445

8. Remove camshaft (8), as follows:

- a. Use Tooling (D) to move camshaft (8) toward the front of the engine. Reposition Tooling (D), as needed.
- b. Move camshaft (8) far enough out of the cylinder head in order to attach a suitable lifting device.
- c. Keep the camshaft level while the camshaft is being removed from the cylinder head. The weight of the camshaft is approximately 39 kg (86 lb).

Alternative Removal Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
E ⁽¹⁾	177-8001	Sleeve	1
F	177-8002	Adapter	1
G	6L-4697	Bolts	3

⁽¹⁾ Part of **177-8003** Engine Tool Group

Start By:

- A. Remove the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".
- B. Remove the rocker arms and the rocker shafts. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Remove".

Note: This is an optional procedure to remove the camshaft. The preceding tool list shows the required tooling for removing the camshaft from the front of the engine or the rear of the engine.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

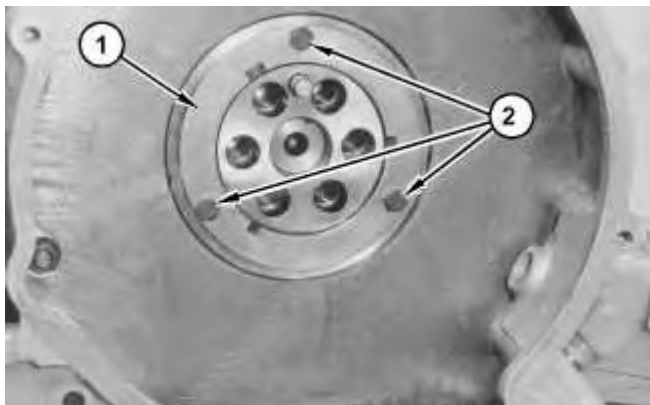


Illustration 10

g01028806

NOTICE

Do not turn the crankshaft or the camshaft while the camshaft gear is removed. If the front gear group is not correctly timed during installation, interference can occur between the pistons and the valves, resulting in damage to the engine.

1. Remove bolts (2) and thrust plate (1) .

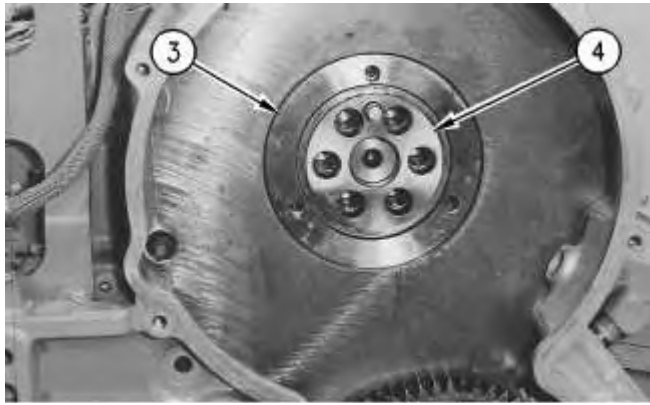


Illustration 11

g00576209

2. Remove seal assembly (3) and adapter (4) .

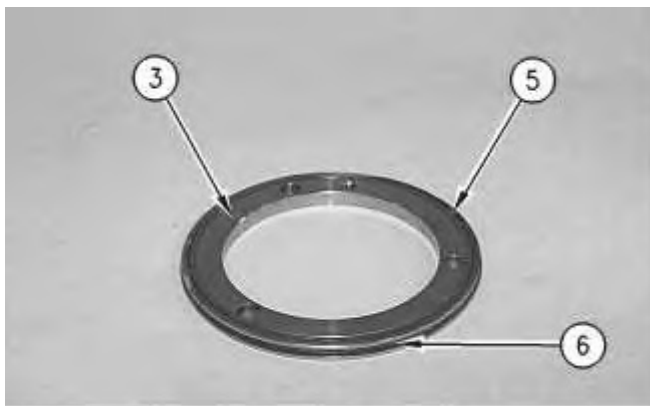
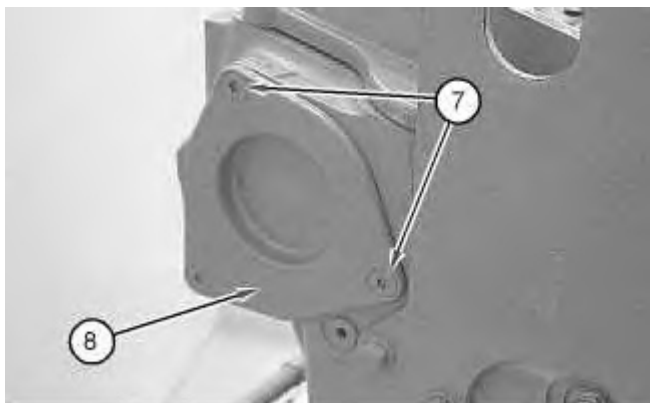


Illustration 12

g00576240

3. Remove O-ring seals (5) and (6) from seal assembly (3) .



4. Remove screws (7) and cover (8) .

NOTICE

Care must be used when removing the camshaft to not damage the highly finished surfaces of both the camshaft and camshaft bearings

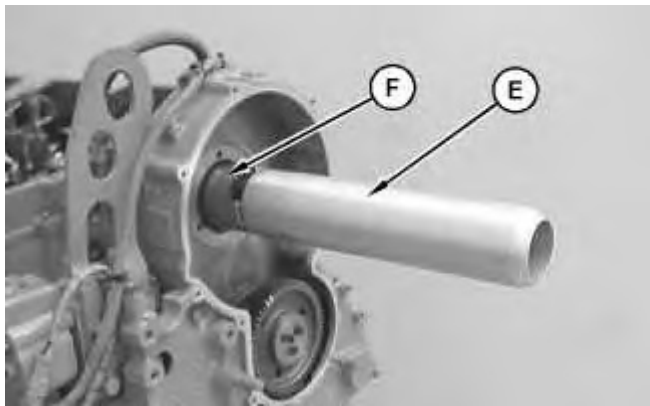


Illustration 14

g01024825

Note: Carefully align Tooling (F) with the end of the camshaft. If the adapter and the camshaft are not aligned, the camshaft may not be removed. The adapter and camshaft bearing will interfere.

5. To remove the camshaft from the rear of the engine, install Tooling (F) on the front of the camshaft with Tooling (G) .
6. Install Tooling (E) .

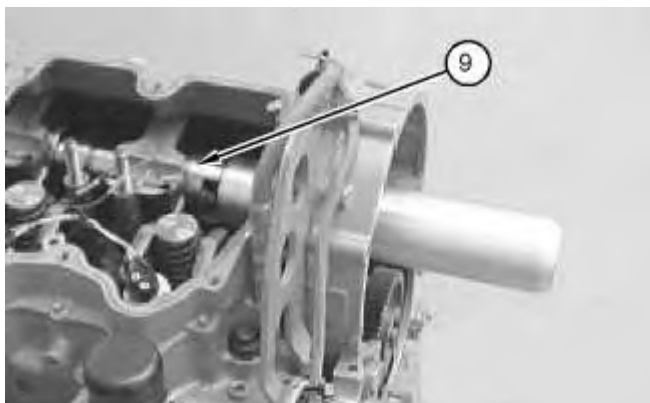


Illustration 15

g01043577

7. Carefully slide the camshaft to the rear of the engine for removal. Use two technicians to remove the camshaft. Keep the camshaft level while the camshaft is being removed from the cylinder head. The weight of the camshaft is approximately 39 kg (86 lb).

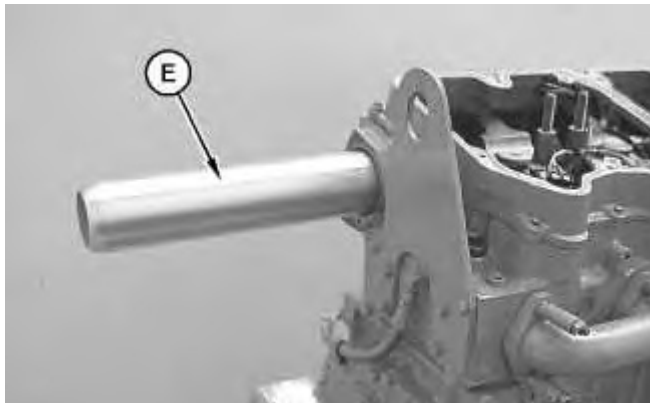


Illustration 16

g01024826

8. To remove the camshaft from the front of the engine, install Tooling (E) on the rear of the camshaft.
 9. Carefully slide the camshaft to the front of the engine for removal. Use two technicians to remove the camshaft. Keep the camshaft level while the camshaft is being removed from the cylinder head. The weight of the camshaft is approximately 39 kg (86 lb).
-

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Model: 824C WHEEL DOZER 85X

Configuration: 824C TRACTOR 85X00001-01193 (MACHINE) POWERED BY 3406 ENGINE

Disassembly and Assembly 3406E and 3456 Engines for Caterpillar Built Machines

Media Number -REN1364-06

Publication Date -01/05/2008

Date Updated -20/05/2008

i02963221

Camshaft - Install

SMCS - 1210-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-7257	Cradle	1
B	9U-7256	Guide	1
C	9U-7225	Camshaft Pilot	2
D	9U-7240	Camshaft Hook	2
H	9U-7243	Alignment Sleeve	1
J	9S-3263	Thread Lock Compound	1
K	8T-2998	Lubricant	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the camshaft and camshaft bearings are thoroughly clean. Lubricate the camshaft lobes with a 50/50 mixture of Tooling (K) and clean engine oil. Apply a thin coat of clean engine oil on the camshaft bearings.

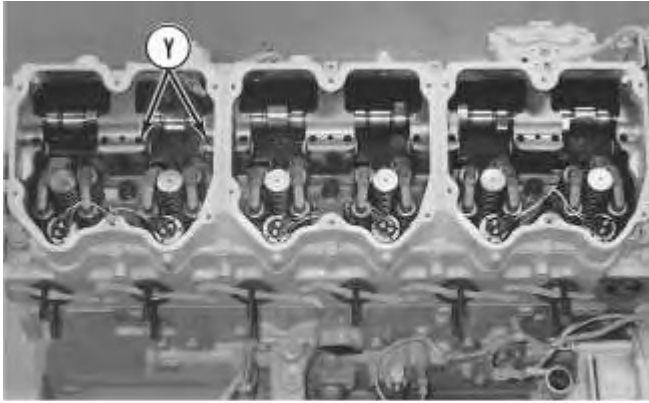


Illustration 1

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Illustration 2

g00581441

2. Install Tooling (A) on the cylinder head at Location (Y) .

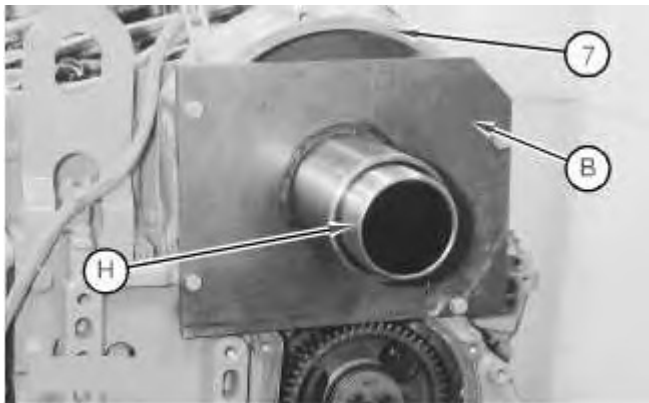


Illustration 3

g01024862

3. Install Tooling (B) on front housing (7) . Do not tighten the bolts that hold Tooling (B) to front housing (7) at this time.
4. Use Tooling (H) to align Tooling (B) with the camshaft bearings. Tighten the bolts that hold Tooling (B) to front housing (7) . Remove Tooling (H) .

Note: Tooling (H) should move freely from the bore of Tooling (B) .

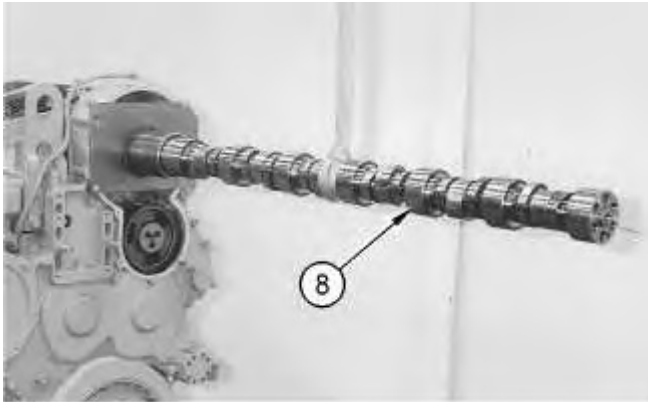


Illustration 4

g00581445

5. Install Tooling (C) in the end of camshaft (8) .

Note: Rotate the camshaft during installation. This will prevent the camshaft from binding in the camshaft bearings.

6. Use a suitable lifting device in order to position camshaft (8) into Tooling (B) and the cylinder head. The weight of the camshaft is approximately 39 kg (86 lb).

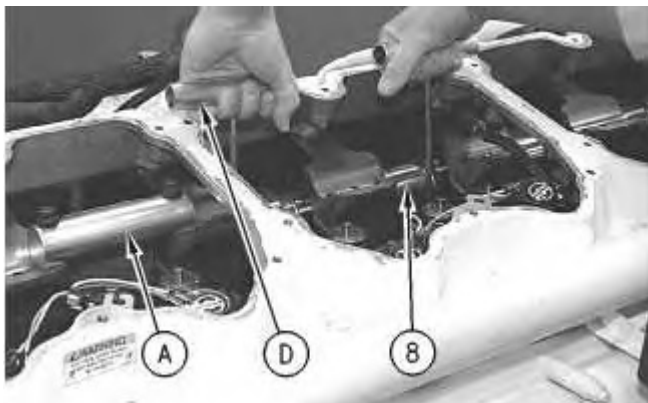


Illustration 5

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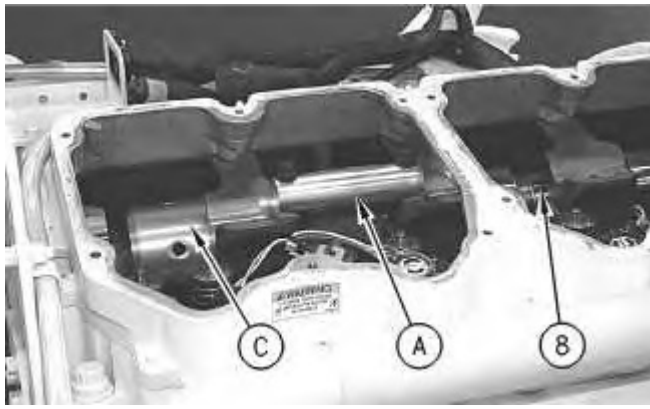


Illustration 6

g00581443

Note: Tooling (C) must be removed before the camshaft can be completely installed in the cylinder head.

7. Remove the lifting device. Rotate the camshaft during installation. Use care not to allow the end of the camshaft and Tooling (C) to drop. Use Tooling (D) to assist in aligning camshaft (8) with the camshaft bearings.
8. Remove Tooling (C) and finish installing camshaft (8) in the bore.
9. Remove Tooling (A) and Tooling (B) .

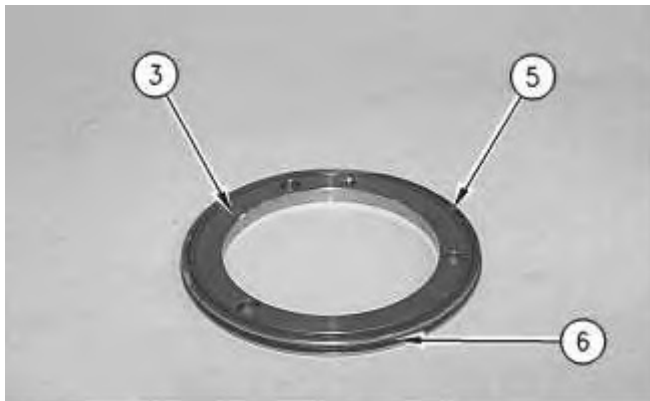


Illustration 7

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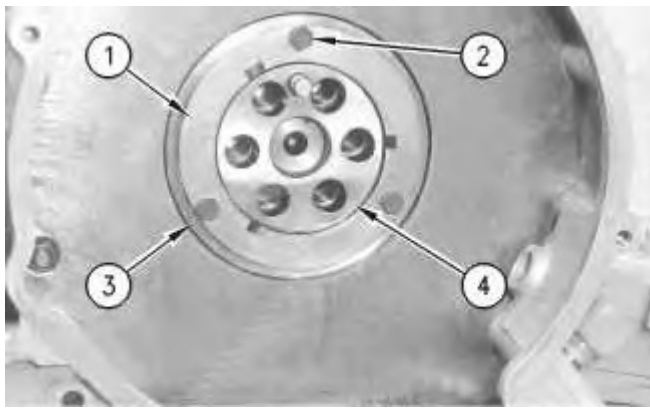


Illustration 8

g00576839

10. Install O-ring seals (5) and (6) in seal assembly (3) . Lubricate seal (6) with Tooling (K) .
11. Install seal assembly (3) . Position adapter (4) . Ensure that the dowel in adapter (4) engages the hole in the camshaft.
12. Position thrust plate (1) . Apply Tooling (J) to bolts (2) . Hold thrust plate (1) in position and install bolts (2) . Evenly tighten bolts (2) until seal assembly (3) and O-ring seal (5) are seated against the cylinder head.

Note: Be careful in order to ensure that O-ring seal (5) stays in the groove in seal assembly (3) .

End By:

- a. Install the rocker arms and the rocker shafts. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Install".
- b. Install the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".

Alternative Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
E ⁽¹⁾	177-8001	Sleeve	1
F	177-8002	Adapter	1
G	6L-4697	Bolts	3
J	9S-3263	Thread Lock Compound	1
K	8T-2998	Lubricant	1

⁽¹⁾ Part of **177-8003** Engine Tool Group

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the camshaft and camshaft bearings are thoroughly clean. Lubricate the camshaft lobes with a 50/50 mixture of Tooling (K) and clean engine oil. Apply a thin coat of clean engine oil on the camshaft bearings.

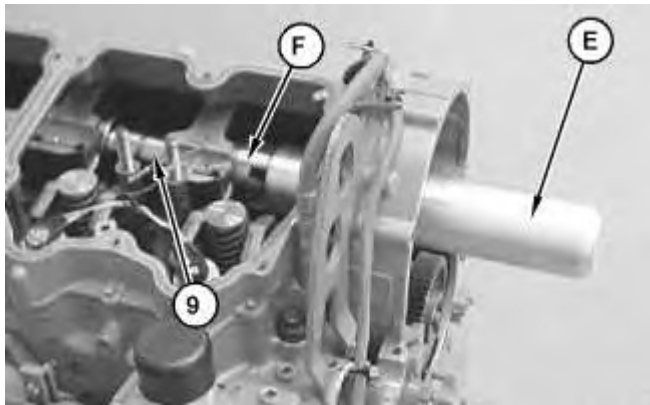
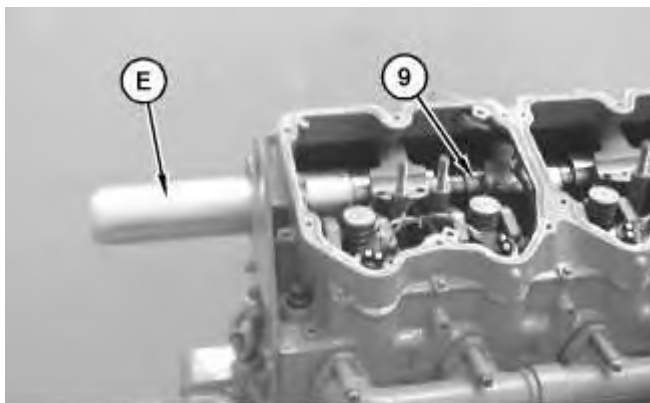


Illustration 9

g01043587

2. Install Tooling (F) on the front of camshaft (9) with Tooling (G) .
3. Install Tooling (E) .
4. Use two technicians to install the camshaft. Carefully slide camshaft (9) into the cylinder head from the rear of the engine. Keep the camshaft level while the camshaft is being installed in the cylinder head. The weight of the camshaft is approximately 39 kg (86 lb).
5. Remove Tooling (F) .



6. Install Tooling (F) on the end of the camshaft.
7. Use two technicians to install the camshaft. Carefully slide camshaft (9) into the cylinder head from the rear of the engine. Keep the camshaft level while the camshaft is being installed in the cylinder head. The weight of the camshaft is approximately 39 kg (86 lb).
8. Remove Tooling (F) .

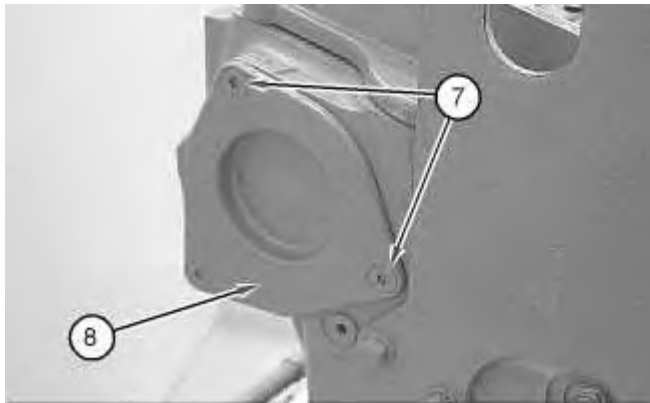


Illustration 11

g01043575

9. Position cover (8) on the rear of the cylinder head. Install bolts (7) .

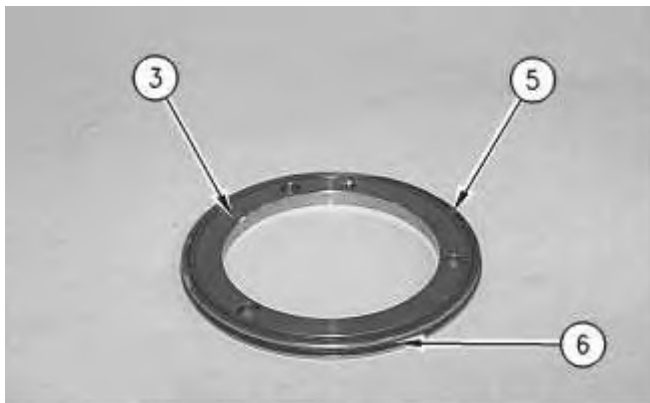


Illustration 12

g00576240

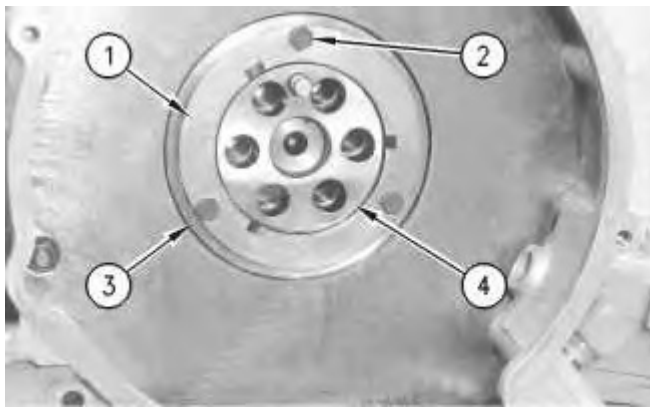


Illustration 13

g00576839

10. Install O-ring seals (5) and (6) in seal assembly (3) . Lubricate seal (6) with Tooling (K) .
11. Install seal assembly (3) . Position adapter (4) . Ensure that the dowel in adapter (4) engages the hole in the camshaft.
12. Position thrust plate (1) . Apply Tooling (J) to bolts (2) . Hold thrust plate (1) in position and install bolts (2) . Evenly tighten bolts (2) until seal assembly (3) and O-ring seal (5) are seated against the cylinder head.

Note: Be careful in order to ensure that O-ring seal (5) stays in the groove in seal assembly (3) .

End By:

- a. Install the rocker arms and the rocker shafts. Refer to Disassembly and Assembly, "Rocker Arm and Shaft - Install".
 - b. Install the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".
-

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