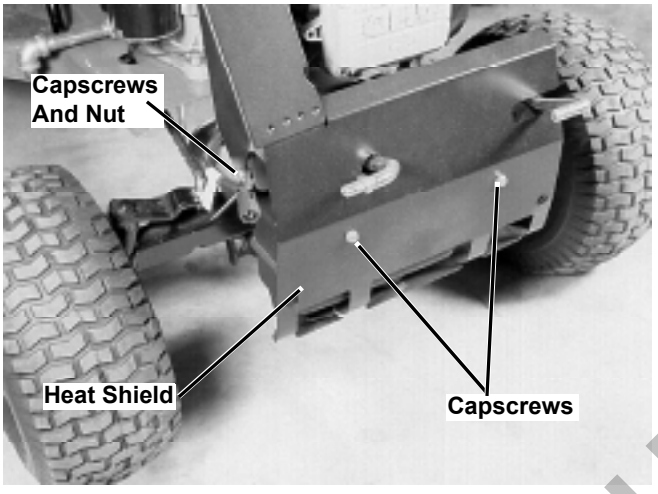
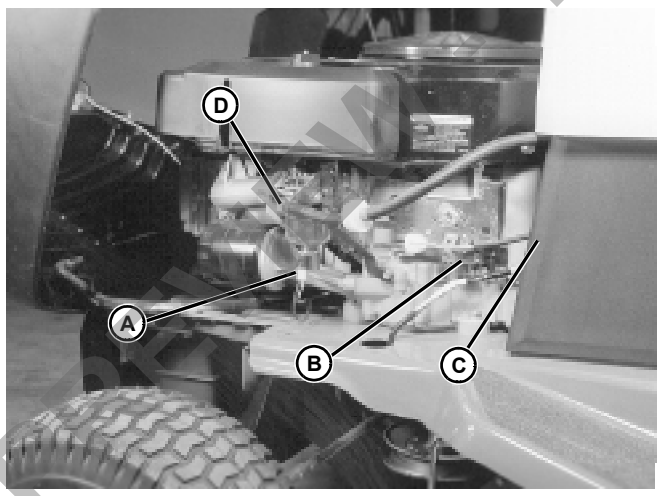
REPAIR

ENGINE REMOVAL

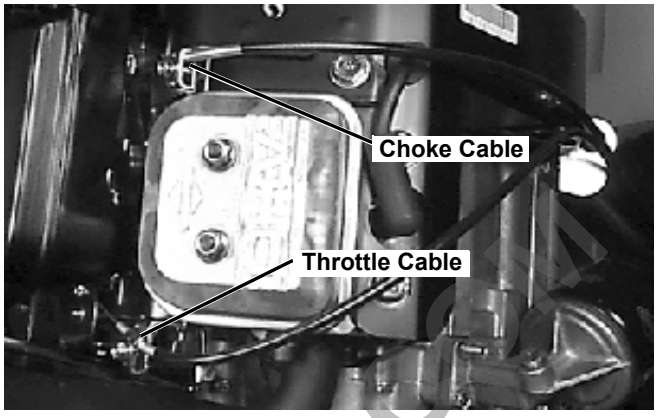
1. Turn all switches OFF and disconnect battery negative (–) cable.
2. Remove mower deck.
3. Raise hood. Disconnect light harness on right side of hood. Lower hood to approximately 3/4 open and slide off bracket.



4. Remove two capscrews securing heat shield to frame. Remove capscrew and nut on side of heat shield. Remove heat shield.



5. Disconnect fuel shut-off solenoid wire (A).
6. Loosen clamp (B) to disconnect throttle cable (C).

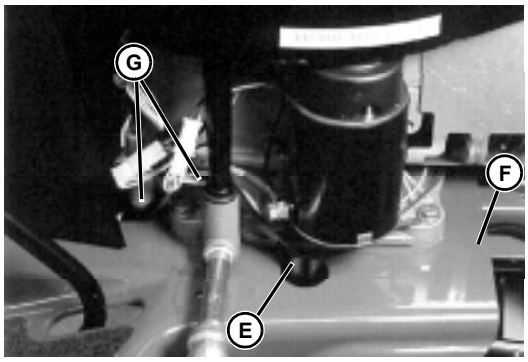


7. On V-twin engines, loosen throttle cable and choke cable clamps. Disconnect cable ends from engine.

CAUTION

Gasoline is explosive. Do not expose to flame or spark. Serious injury can result. Store in a properly marked, safe container. Wipe-up any spills IMMEDIATELY.

8. Disconnect hose clamp (D) and slide fuel line off hose barb on carburetor on single cylinder engines, and fuel filter (engine side) on V-twin engines.



9. Disconnect wires from starter terminal (E).

NOTE: Ground terminal (F) will be disconnected when engine mounting bolt is removed.

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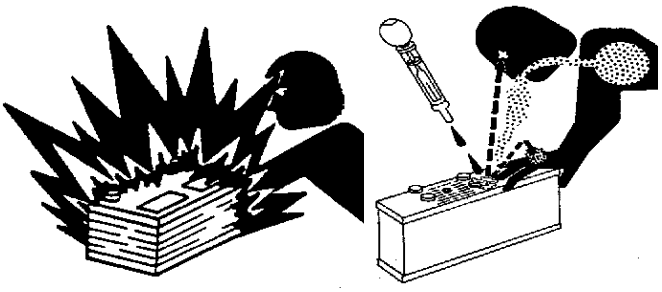
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USE CARE IN HANDLING AND SERVICING BATTERIES



- **PREVENT BATTERY EXPLOSIONS**
  - Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.
  - Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.
  - Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

- **PREVENT ACID BURNS**
  - Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

- **Avoid acid burns by:**
  1. Wearing eye protection and rubber gloves.
  2. Avoiding breathing fumes from electrolyte.
  3. Avoiding tipping battery.
  4. Use proper jump start procedure.

- **If you spill acid on yourself:**
  1. Flush your skin with water.
  2. Apply baking soda to help neutralize the acid.
  3. Flush your eyes with water for 10–15 minutes.
  4. Get medical attention immediately.

- **If acid is swallowed:**
  1. Drink large amounts of water or milk.
  2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
  3. Get medical attention immediately.

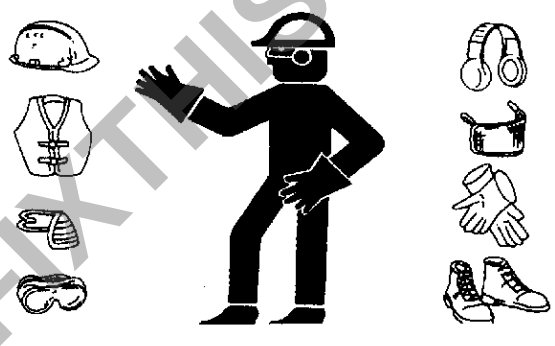
USE SAFE SERVICE PROCEDURES

- **WEAR PROTECTIVE CLOTHING**

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



- **SERVICE MACHINES SAFELY**

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

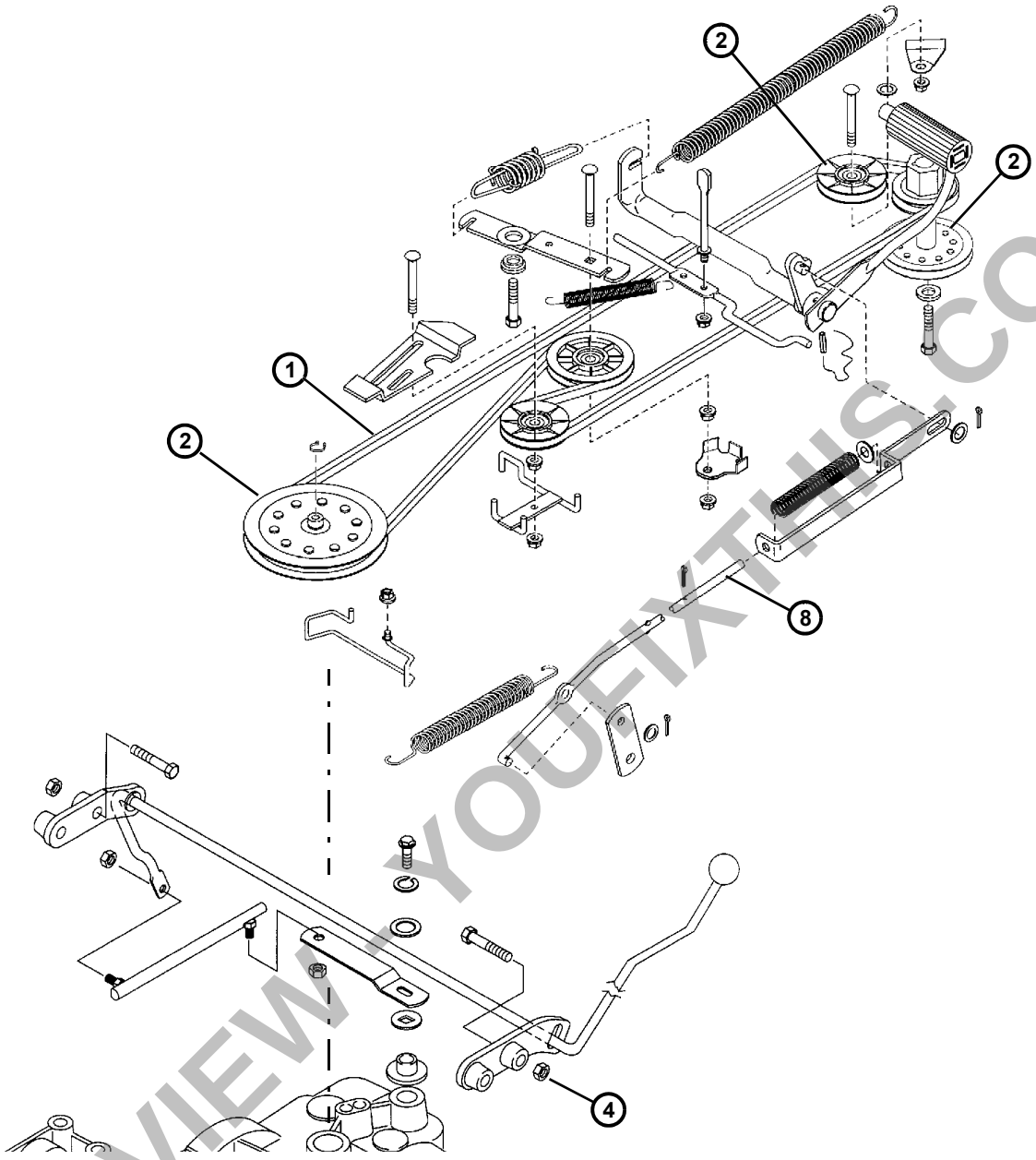
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.

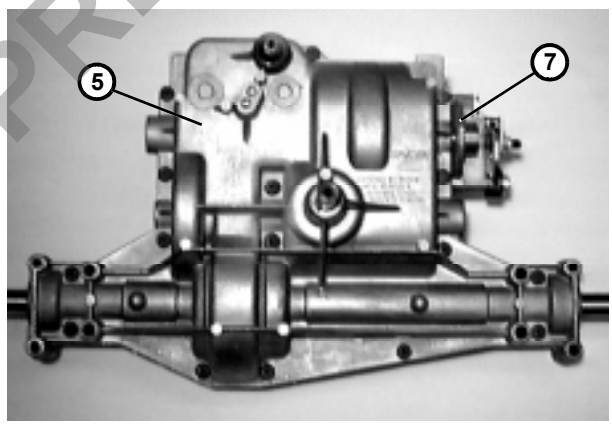
- **USE PROPER TOOLS**

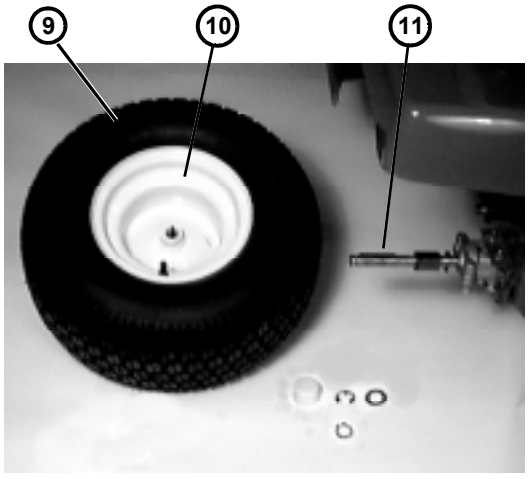
Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards. Use power tools only to loosen threaded parts and fasteners. For loosening and tightening hardware, use the correct size tools. **DO NOT** use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches. Use only service parts meeting John Deere specifications.

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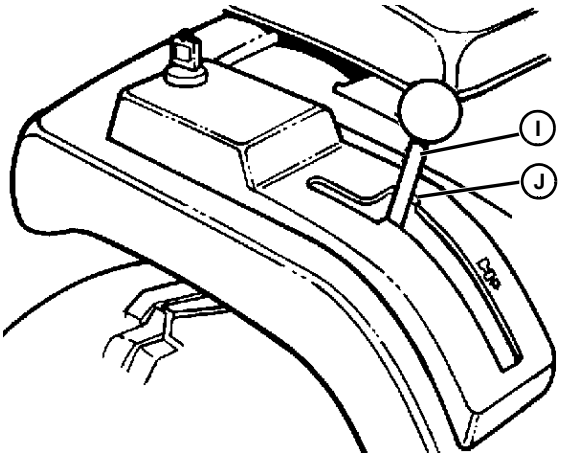


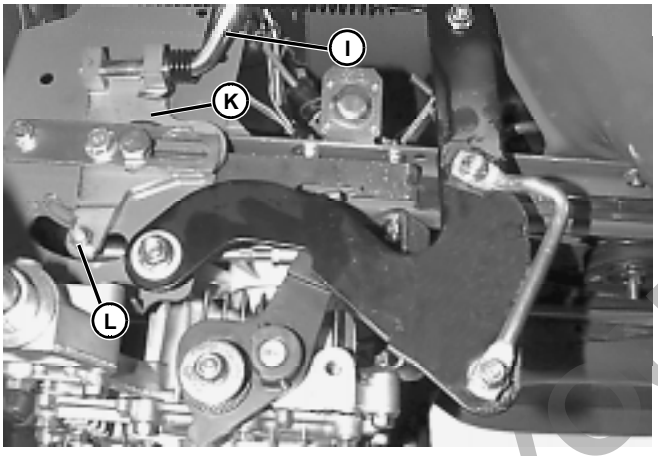




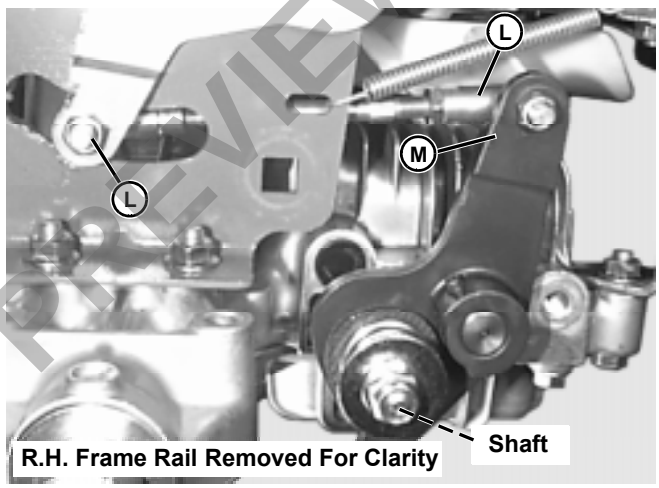
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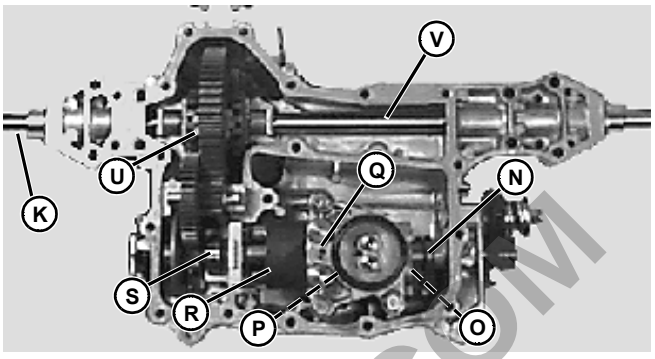




When the hydrostatic drive lever (I), is in the neutral position (J), the shift bracket (K) is centered and the turnbuckle link (L) is centered in the slot on the right side frame.



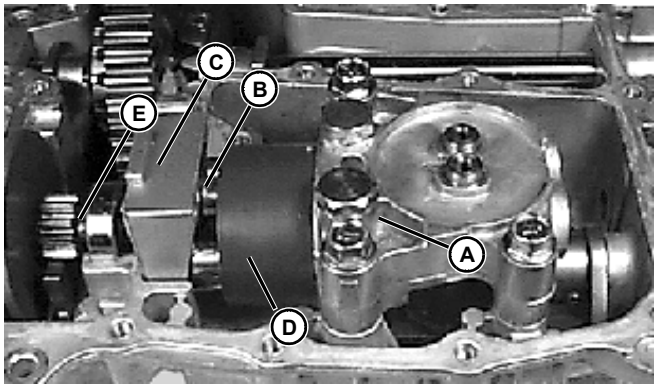
The turnbuckle link (L) moves the transaxle shift lever (M). The shift lever turns the transaxle shifter shaft.



When in neutral, the shift linkage holds the shifter shaft (N) and the variable-angle pump swashplate (O) in the neutral position. While in neutral (swashplate level) position, the pump cylinder block (P) rotates with the pump (input) shaft but does not pump any oil into the motor half of the center block (Q) because the pump pistons are not moving up and down as they rotate. Therefore, the motor cylinder block (R) does not turn nor do the motor (output) shaft (S), differential assembly (T), or drive axles (U and V).

Forward:

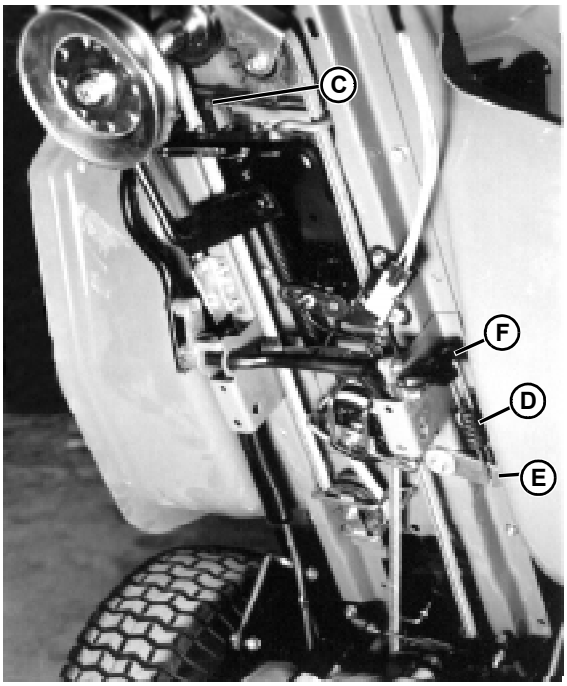
When the shift lever is moved into forward position, the shift bracket pivots, pulling the turnbuckle link rearward. The transmission linkage turns the shifter shaft, and through it, the variable-angle pump swashplate into forward position.

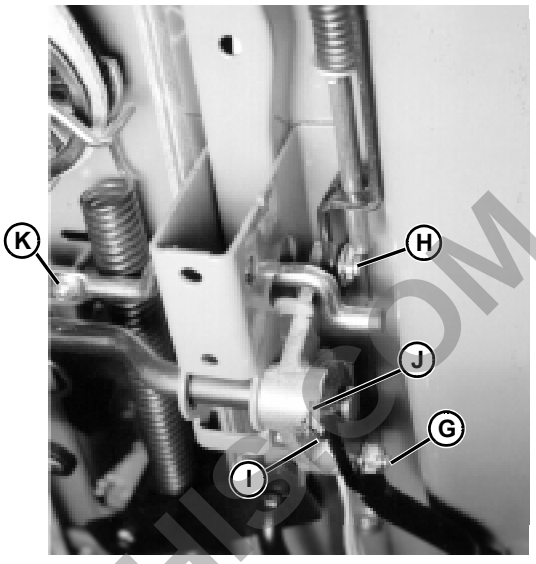


With the pump swashplate angled in forward position, the pump cylinder block pistons are pumping oil through one side of the center block (A) into the pistons (B) of the motor, forcing the pistons out against the fixed-angle swashplate (C). As the pistons slide down the swashplate surface, the motor cylinder (D), motor (output) shaft (E), differential assembly, and drive axles to turn in the forward direction.

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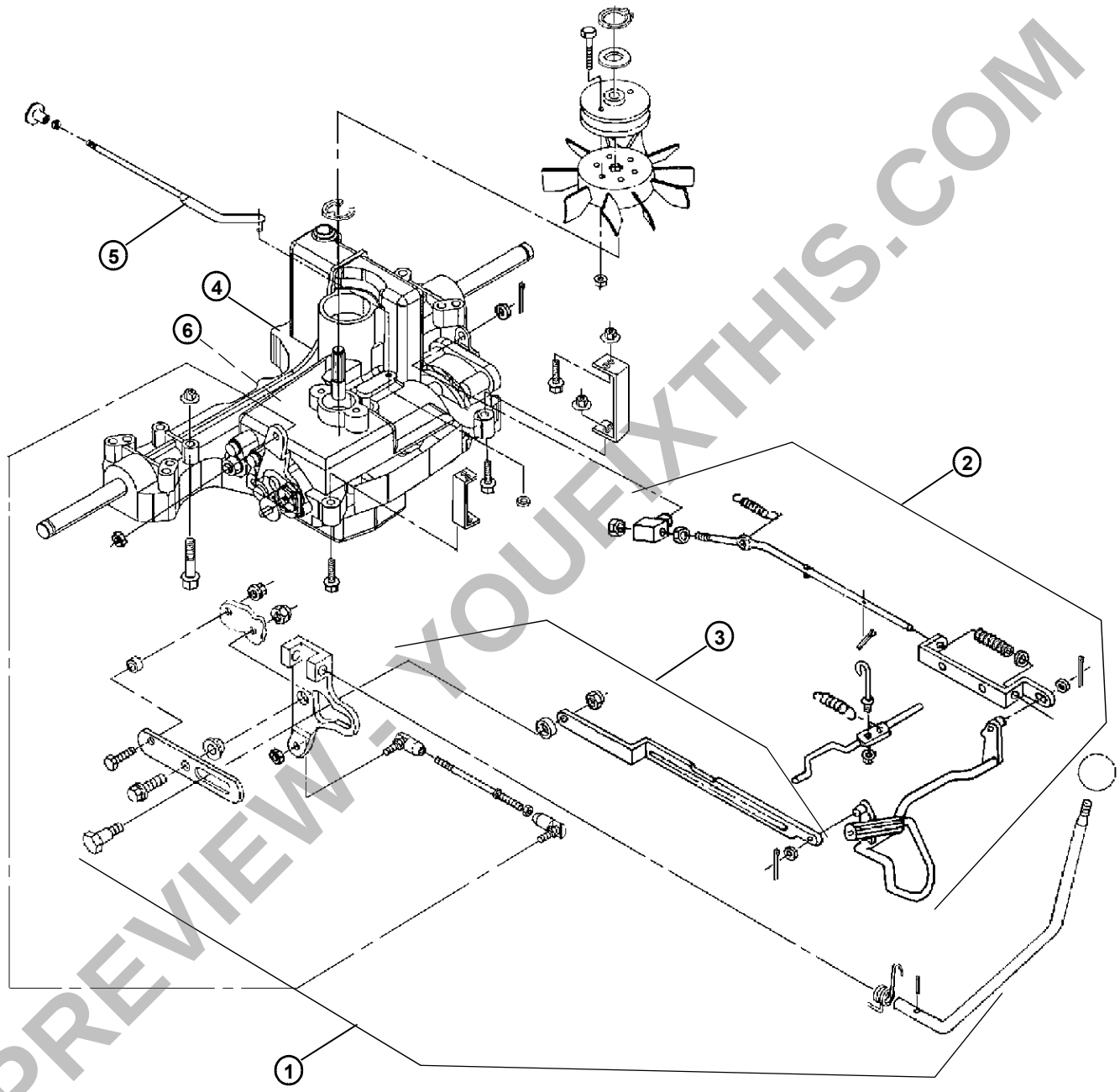
⚠ CAUTION

Clutch tension spring is capable of causing extreme injury if allowed to be released quickly from mower frame. Protect your face, eyes and hands before releasing spring.

7. Thread one end of a three foot long piece of starter rope under the front hook of clutch tension spring (C). Pull rope half way through spring until ends meet, and wrap ends around a bar several times to make a temporary handle. Pull handle until spring hook is free from frame, and release tension from spring. Tension is now off traction drive system and it may be worked on safely.
8. Remove clutch actuating spring (D) from clutch bellcrank (E) and cross shaft (F).
9. Remove clutch/brake pedal by removing mounting nut (G) and pulling pedal through frame.
10. Remove brake bracket from bellcrank by removing cotter key and washer (H).
11. Remove bellcrank from clutch shaft by removing safety wire (I) securing roll pin, then driving out roll pin (J) and removing bellcrank.
12. Remove two bolts and nuts through retainer plate holding left end of clutch shaft, and remove shaft from frame.
13. Remove nut (K) holding parking brake lock lever to parking brake locking rod.
14. Remove spring from frame to parking brake locking rod and slide rod out of frame.
15. Bellcrank assembly is held to frame with one bolt and bushing.

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IMPORTANT: PAY CLOSE ATTENTION to the ORDER and ORIENTATION of ALL COMPONENTS to their neighboring components.

1. Carefully separate pump and swashplate components.
2. Clean and inspect components individually once disassembled:

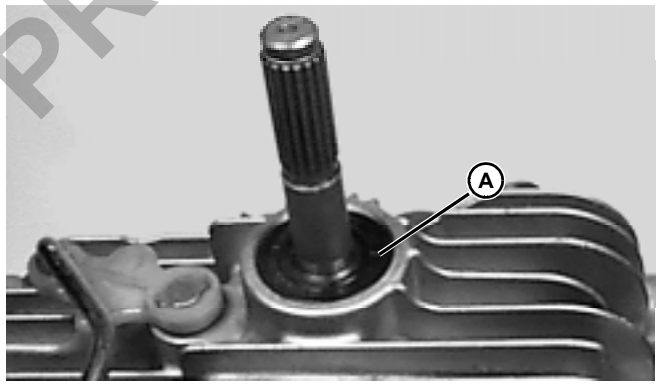
- inspect pump body (A) for cracks, scoring, pitting and discoloration;
- check valve ball bearings in pump body (A) should move freely in their housings;
- mating surfaces of pump body (A) should not be grooved, discolored or worn thin around ports;
- pump cylinder block (B), pistons (C) and springs must have free movement and should not be scored, pitted, discolored, distorted or worn;
- mating surface of pump cylinder block (B) should not be grooved, discolored or worn thin around ports;
- thrust bearings (D) should not be scored, pitted, distorted, or worn;
- swashplate (E) surfaces of ramps and bearing recess should not be scored, pitted, discolored or worn badly;

NOTE: Larger inside diameter (also thinner) thrust washer seats closest to swashplate as compared to thrust washer closest to pump cylinder.

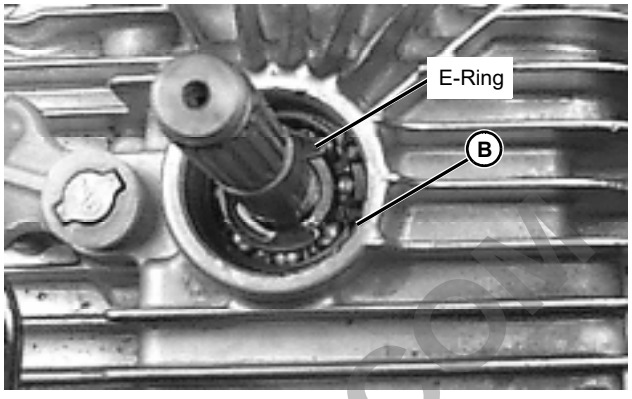
- swashplate roller bearing (F) and thrust washers should not be scored, pitted, discolored, missing any ball bearings or have any broken ball bearing retainers;

Remove/Install Input Shaft Assembly—

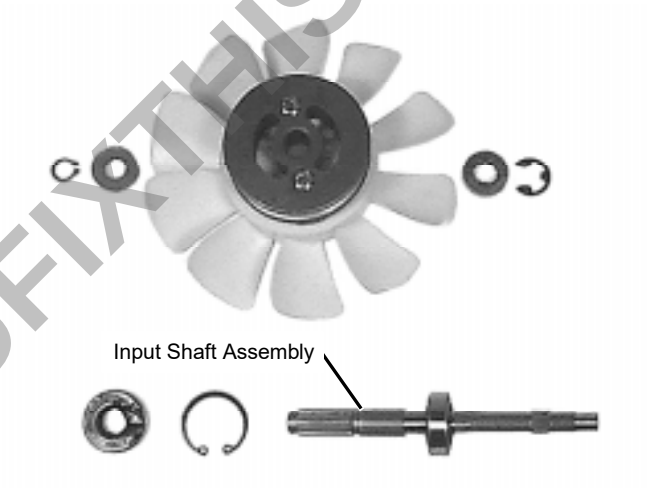
IMPORTANT: Carefully remove components so case bore is not damaged.

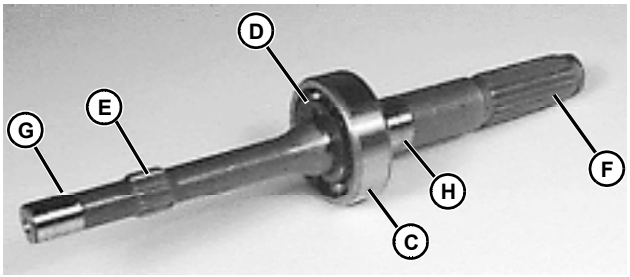


3. Remove input shaft seal (A) and discard.



4. Remove c-clip (B) and input shaft assembly. Do not remove e-ring at this time.

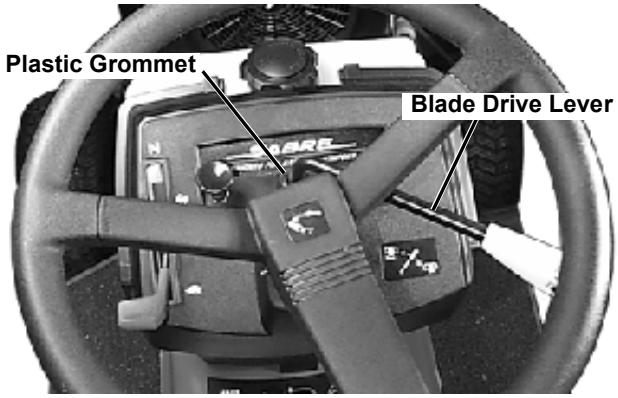




5. Inspect ball bearing (C) for scoring, pitting, discoloration and other wear.
6. If damaged, remove two e-rings (D) to remove and replace bearing.
7. Inspect splines (E and F) for chipped or broken teeth, and machined surfaces (G and H) for scoring, pitting, discoloration and other wear. Replace shaft as necessary and install in reverse order of removal.
8. Wrap tape around shaft splines (F) to protect seal.
9. Apply grease to lip surfaces of seal before installing it flush with transaxle case lip.
10. Install new input shaft seal (A).

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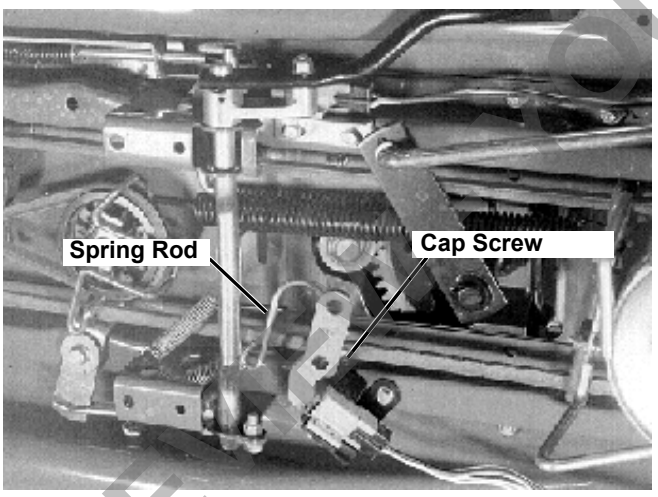
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24. Place blade drive lever into hole in dash and frame.
25. Insert plastic grommet

NOTE: Apply anti-seize lubricant to steering shaft before installing steering wheel.

26. Install washer(s) onto steering shaft.
27. Install steering wheel and fasten with cap screw and lock nut.
28. Connect throttle cable and choke cable (v-twins).



29. Assemble spacer, switch cam, spring rod on tension lever end. Line up holes in shaft and cam and Secure with cap screw and nylock nut
30. Add fuel to tank and turn fuel shutoff valve (early models only) to ON position.
31. Check for and fix any leaks from fuel system.

M

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