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WAR DEPARTMENT TECHNICAL MANUAL

DECLASSIFIED
Auth: NND 775126
By NNHP NARS 3-3-78

ORDNANCE MAINTENANCE

Ordnance Engine Model RD-1820 (Caterpillar)

This record was previously
allocated to RG 319 (Entry
No. 382) and is now assigned
to RG 287.

WAR DEPARTMENT

9 DECEMBER 1943

FOR ORDNANCE PERSONNEL ONLY

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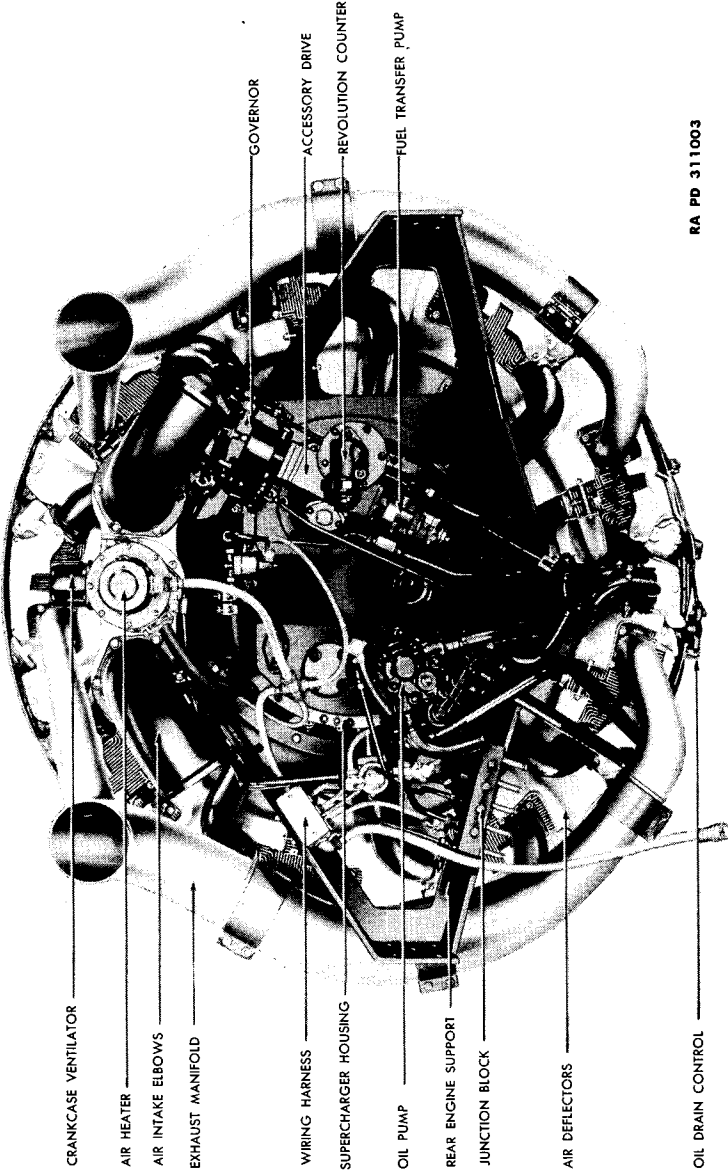
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RA PD 311003

Figure 2 — Rear View of Engine

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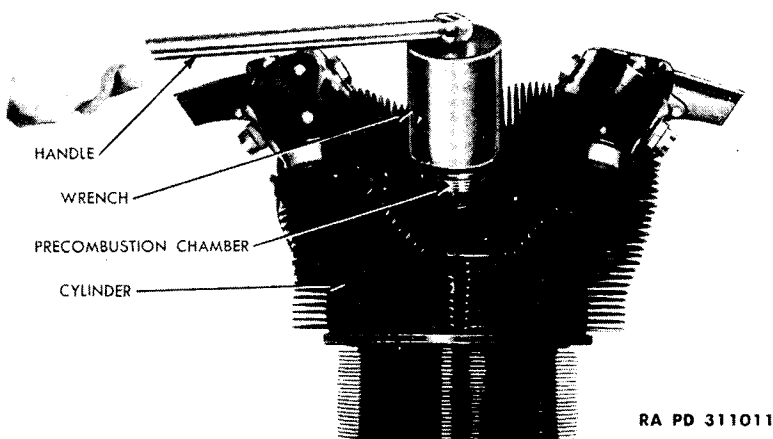


Figure 13 — Removing Precombustion Chamber, Using Wrench 5A1937

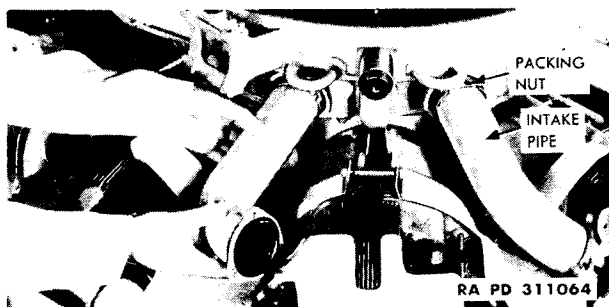
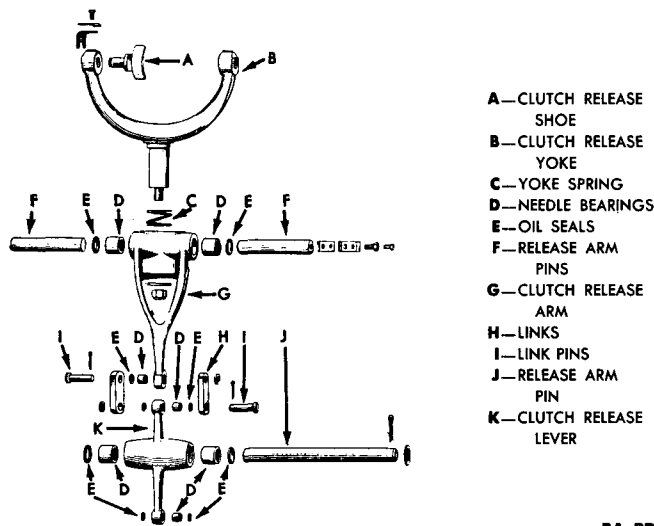


Figure 14 — Removing Intake Pipe

o. Remove Crankshaft (fig. 20). Install lifting eye (5A2265) over threads at end of crankshaft, and lift crankshaft and connecting rod assembly out of crankcase main rear section.

p. Remove Supercharger (fig. 21). Rotate engine stand so that supercharger is in the upward position. Remove nuts securing supercharger rear housing to supercharger front housing. Install lifting eye (5A2207) to supercharger rear cover and lift supercharger from engine. **CAUTION:** *Insure that supercharger is lifted straight off to avoid damage of seal rings.* Remove supercharger front housing and crankcase rear main section by removing bolts that secure front supercharger housing to rear engine support.

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)



- A—CLUTCH RELEASE SHOE
- B—CLUTCH RELEASE SHOE
- C—YOKE SPRING
- D—NEEDLE BEARINGS
- E—OIL SEALS
- F—RELEASE ARM PINS
- G—CLUTCH RELEASE ARM
- H—LINKS
- I—LINK PINS
- J—RELEASE ARM PIN
- K—CLUTCH RELEASE LEVER

RA PD 311052

Figure 26 — Clutch Control Disassembled

(3) **INSTALL OIL LINES.** Install gasket and oil suction tube assembly from base of transfer case to inlet of oil pump. Tighten cap screws and lock wire. Install gasket and oil outlet assembly at outlet of transfer case oil pump with nipple pointing towards left viewed from cover side of transfer case. Secure in place with cap screws and lock wire. Install gasket and oil distributing pipe assembly in opening in transfer case cover above oil pump. Install gasket and oil inlet assembly over distributing pipe. Position oil inlet assembly with nipple pointing towards the right. Secure in place with cap screws and lock wire. Screw breather adapter into top of transfer case and install gasket and breather tube pipe assembly, securing in place with cap screws and lock wire.

9. CLUTCH CONTROL AND OIL COOLER.

a. Oil Cooler (fig. 1).

(1) **DISASSEMBLY.** Disconnect oil outlet pipe from cooler. Remove cap screws holding oil cooler to transfer case support and lift out oil cooler. **CAUTION: Handle carefully and do not twist cooler.**

(2) **CLEANING.** Refer to paragraph 5 a.

(3) **INSPECTION.** Inspect oil cooler for cracked, broken or damaged tubes. Inspect bypass tubes for mutilations causing possible restrictions. Test cooler by filling with oil and applying 200 pounds air pressure.

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)

(f) *Valve Guides.* If valve guides do not require replacement, clean bores with crocus cloth and suitable lubricant. To replace valve guides, drill out old guide so that a thin shell remains in cylinder head. Break out this shell, being careful not to damage bore of cylinder head. If bore of cylinder head has not been damaged, a standard valve guide may be installed. If oversize guide must be used, ream to obtain proper fit between valve guide and cylinder head. Press in new guide after heating cylinder assembly to 300°F. for one hour. Valve guide flange must bottom within 0.001 inches of head. Ream newly installed valves to obtain proper fit, with valve stems (Refer to par. 22). Clean bores with crocus cloth. Reface valve seats after installation of new guides.

(g) *Valves.* Stone burs or nicks from valve spring washers and from retainer locks. Reface pitted or warped valve faces, removing no more metal than is necessary to true up face. Remove carbon and discoloration by polishing with crocus cloth and gasoline. Do not attempt to remove more than 0.005 inch of metal from diameter of exhaust valve. Grind faces of exhaust valves to an angle of 43° 30' to 43° 45'. If a valve does not seat properly upon testing, it is permissible to lightly lap valve and seat.

(5) **ASSEMBLY.** Lubricate valve stems with engine oil. Place both valves in cylinder. Install lower valve spring washers around each valve guide. Place inner, intermediate, and outer valve springs, in place on lower washers and the upper valve spring retainer washer on top of springs. Compress valve springs, using valve spring compressor (5A2286) and install valve locks (fig. 32).

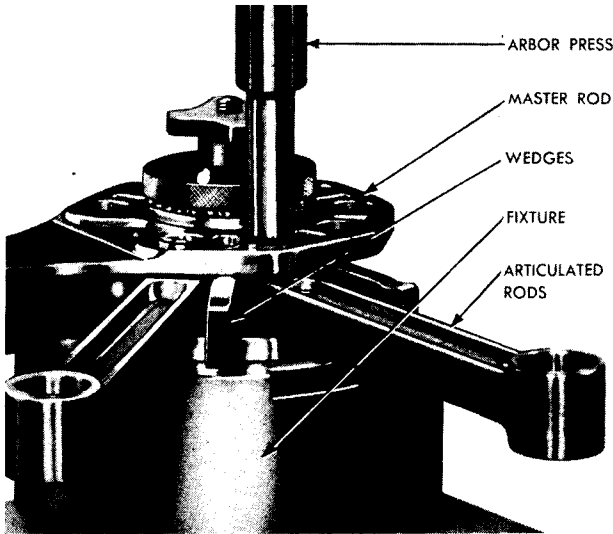
14. CRANKCASE FRONT SECTION.

a. **Disassembly** (fig.17).

(1) **FUEL PUMP CAM.** Remove cap screws that retain fuel cam thrust washer to cam bearing support. Lift out fuel pump cam. Remove fuel injection pump rack by removing nuts from thrust bearing retainer flange on front of crankcase front section and withdraw bolts. Remove two cam bearing support cap screws. Remove support and fuel injection pump rack.

(2) **THRUST BEARING.** With thrust bearing retainer and cam bearing support removed, press thrust bearing from crankcase front section. Remove fuel valve lifter retaining screws from fuel injection pump pad on crankcase front section. Lift out fuel valve lifter.

(3) **FUEL PUMP CONTROL.** Remove cap screws holding body and sleeve to crankcase, and lift off governor fuel pump control which is located between No. 1 and No. 2 cylinders. Loosen cap screws that lock fuel pump control dogs (fig. 64) to pump control shaft. These



RA PD 311016

Figure 42 — Removing Knuckle Pins, Using Wedges 5A2309 and Fixture 5A2308

(7) **REMOVE KNUCKLE PIN LOCKING PLATE.** Place master rod and articulated assembly on a bench, rear end down. Bend down knuckle pin lock screw tabs and remove lock screws and tabs. Lift off knuckle pin locking plate (fig. 41).

(8) **REMOVE KNUCKLE PINS.** Place knuckle pin assembly and disassembly fixture (5A2308) on an arbor press table (fig. 42). Locate knuckle pin to be removed over a hole in fixture. Insert two wedges (5A2309) between flanges of master rod, one on each side of articulated rod to be removed, to prevent possible damage to master rod flanges when pressing out knuckle pin. Press out knuckle pin, using removing plug under arbor, fitting step of plug in step of knuckle pin. Remove knuckle pin and articulated rod. Remove all knuckle pins and articulated rods in same manner, each time moving wedges to respective articulated rod.

b. Cleaning. Wash all parts thoroughly in dry-cleaning solvent. Clean bearings (par. 8 b).

c. Inspection.

(1) **CRANKSHAFT FRONT AND REAR MAIN BEARINGS.** Check fit of the bearing on shaft and in crankcase (par. 22). Inspect rollers and races, using a magnifying glass, for cracks and pitted or galled surfaces. Examine retaining surfaces for cracks and wear (par. 8 c (11)).

(2) **CRANKSHAFT FRONT.** Inspect crankshaft front for cracks.

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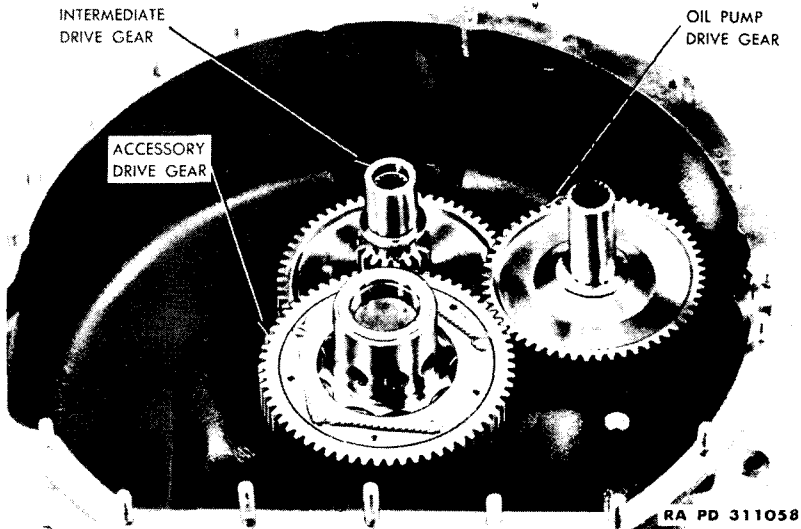


Figure 47 — Accessory Drive Gears

rear cover and remove puller cap screws. Lift oil pump drive gear (fig. 47) from supercharger rear housing.

(3) **REMOVE IMPELLER DRIVE.** Lift out accessory drive shaft, making certain shaft splines do not scratch or score impeller shaft bushings. Remove bronze thrust ring from recess in impeller shaft retainer. Remove five screws which attach accessory drive gear rear plate to shaft and remove plate. While disassembling springs and retaining pins from shaft, wrap a heavy cloth tightly around accessory drive gear and rear end of shaft, so that when the springs are driven out of shaft they will not be free to fly. Stand the shaft on a disassembly bench, rear end down, and drive out springs and retaining pins with a mallet. Remove cloth from shaft. Remove gear by turning approximately 30 degrees to disengage internal lugs on gear from mating ears on shaft. Remove the five flat head screws which secure impeller shaft retainer to rear housing. Remove retainer, ring, shims, spherical thrust ring, and steel washer.

(4) **REMOVE IMPELLER AND IMPELLER SHAFT.** Place strips of light cardboard between impeller vanes and diffuser plate to protect these parts during the following operations. Bend tab of impeller nut lock out of slot of nut. Install impeller holding fixture (5A2170) on supercharger rear housing (fig. 48). With impeller locked firmly, remove impeller nut using lug wrench (5A2264). Remove impeller nut lock and impeller shaft front oil sleeve and rings. Remove oil seal

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)

rear housing cover. Place oil pump drive gear in position in supercharger rear housing, meshing with accessory drive gear (fig. 47).

(5) **INSTALL SUPERCHARGER REAR COVER.** Insure that parting surfaces of supercharger rear housing and cover are clean and smooth. Install new gaskets on supercharger rear housing. Lower cover onto supercharger rear housing, making certain that ends of all shafts in rear housing enter their respective bushings in rear cover. Secure supercharger rear housing cover to rear cover by installing elastic stop nuts on rear cover attaching studs. Install accessory drive cover plate to rear supercharger housing cover, securing in place with elastic stop nuts.

(6) **ACCESSORY DRIVE** (fig. 51).

(a) *Install Governor Drive.* Install rubber seal in groove in governor drive shaft bearing assembly. Insert governor drive shaft gear through bearing assembly so that gear end of shaft is on anti-oil-seal end of bearing assembly. Install key in shaft and place gear on key and shaft so that large internal diameter hub is against bushing of bearing assembly. Secure gear on shaft with nut and tab lock. Bend lock up on nut and down on flat on gear. Place gasket over studs on rear supercharger cover, lining up oil holes in gasket with oil holes in cover and install bearing and gear assembly into rear cover, mating large spur gear with supercharger drive shaft gear in rear housing. Insure that rubber oil seal on bearing assembly enters rear housing without binding.

(b) *Assemble Governor and Revolution Counter Drive.* Press revolution counter drive shaft thrust button into accessory drive housing. Install governor, revolution counter shaft, and plug assembly, into bushing in housing. Place gasket over studs in housing. Install rubber oil seals on governor drive shaft bushing assembly, and place assembly over shaft into housing. Tighten bushing assembly, and check end clearance of governor, revolution counter shaft, and plug assembly. If end clearance is below 0.013 inch, replace gasket under bearing assembly to obtain this dimension. Install oil seal over shaft into housing at splined end of shaft, and place governor drive coupling in place at opposite end of shaft.

(c) *Assemble Revolution Counter Drive.* Place key in revolution counter drive shaft. Install revolution counter drive gear over key and shaft, so that extended hub will be towards end of shaft. Hold gear so that distance from end of shaft to opposite face of gear is 0.878/0.870. Drill a 0.0943- to 0.0938-inch diameter hole through shaft and gear by piloting drill in hole in gear hub. Drive grooved locking pin through hole to secure gear on shaft. In driving pin into hole, enter ungrooved end of pin into hole first. Place revolution counter drive shaft assembly in housing so that end of shaft bottoms on button in housing and gear meshes with governor and transfer pump drive shaft gear. Place gasket

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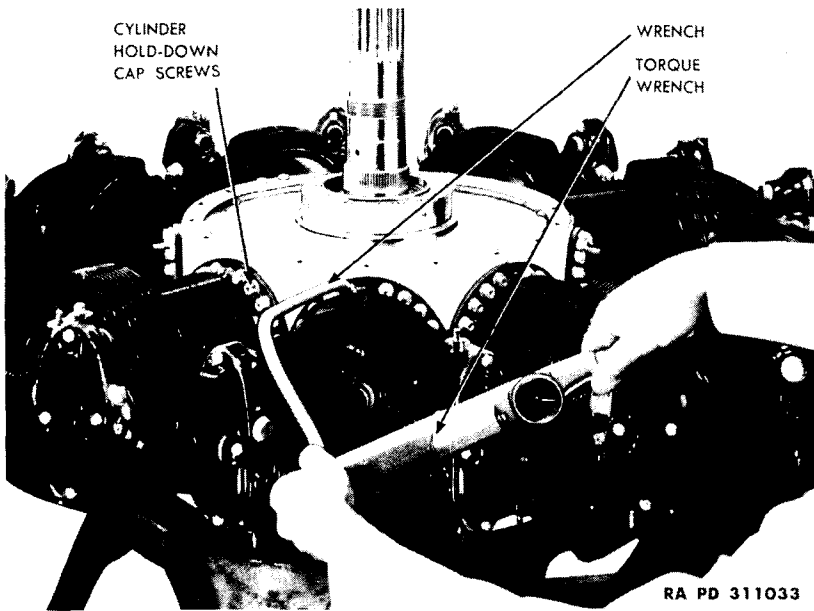


Figure 66 — Tightening Cylinder Hold-down Cap Screws, Using Wrench 5A2268

(fig.66.). (Refer to par. 42). Speed wrench (5A2269) is used to run in cap screws. Lock wire cap screws.

g. Install Rocker Arms and Push Rod Housings.

(1) **INSTALL VALVE TAPPET BALL SOCKETS.** Insert each valve tappet spring and valve tappet, insuring that all parts are thoroughly coated with engine oil before assembly.

(2) **INSTALL PUSH ROD HOUSINGS** (fig. 31). Install short hose on rocker end of push rod housing. The rocker end of push rod housing may be identified by location of heading which is approximately $\frac{3}{8}$ inch from the end. Install long hose connections and two clamps per connection on crankcase end of housing. The heading at this end of housing is directly at the end. With hose connections and clamps assembled on push rod housing, install housing on engine, pushing it all the way on to its rocker arm connection and tighten clamp. Slide crankcase end hose connection over tappet guide and tighten both clamps. Oil push rod ends with clean engine oil and insert push rods in housings through rocker box.

(3) **INSTALL ROCKER ARMS** (fig. 11). Loosen adjusting screws and insert clamping screws in rocker arms. Do not tighten clamping screws. Lubricate rocker arms and bolts with clean engine oil. Install rocker arm and insert rocker bolt with spherical washer and rubber

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d. Pistons and Cylinders.

Fig No.	Ref Key	Fit Location	Type	Manufacturing		Replace if Beyond
				Min	Max	
69	AM	Piston and ring, No. 1 groove	Side	0.0050L	0.0066L	0.0066L
69	AN	Piston, ring, and spacer, Nos. 3 and 4	Side	0.0025L	0.0042L	0.0042L
69	AO	Piston Rings, Nos. 1 and 2	Gap	0.025	0.035	
69	AP	Piston and Pin	Diam	0.000	0.001L	0.003L
69	AQ	Piston pin and rod bushing	Diam	0.0020L	0.0035L	0.006L
69	AR	Piston Rings, Nos. 3 and 4	Gap	0.015	0.025	
69	AS	Piston and ring, No. 2 Cylinder Barrel and Piston	Side	0.0030L	0.0046L	0.0046L
69	AT	At No. 3 ring, parallel to crankpin	Diam	0.0355L	0.0385L	0.0485L
69	AT	At No. 3 ring, 90° from crankpin	Diam	0.0195L	0.0225L	0.0325L
69	AU	At bottom of skirt, parallel to crankpin	Diam	0.0335L	0.0365L	0.0465L
69	AU	At bottom of skirt, 90° to crankpin	Diam	0.0175L	0.0205L	0.0305L
69	AV	Cylinder bore out of round	Diam			0.005

e. Air Heater.

69	AW	Electrodes	Gap	0.012	0.015	
69	AX	Nozzle orifice	Diam	0.0670	0.0675	
69	BA	Pump shaft	End	0.002L	0.004L	0.007L
69	BB	Pump vane	End	0.000	0.003L	0.007L
69	BD	Pump rotor and housing	Diam	0.001L	0.003L	0.006L
69	BE	Pump shaft slot and vanes	Side	0.002L	0.005L	0.010L
69	BF	Pump shaft and bushing	Diam	0.001L	0.003L	0.006L
69	BG	Pinion and gear	Backlash	0.0045	0.0065	0.0095

f. Accessory Drive.

69	BH	Main drive gear and drive gear	Backlash	0.004	0.012	0.022
69	BI	Governor drive shaft	End	0.007	0.013	0.025

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)

centrifugal force alone is sufficient to maintain blade contact. A seal is incorporated in the pump to minimize leakage around rotor shaft. A composition rubber seal ring cushions the disk against retainer (lock nut) and compensates for slight universal action of coupling. This seal depends on a spring for sufficient thrust to be effective. The spring must have sufficient tension to overcome pressure of fuel that may by-pass around rotor shaft. A relief valve is contained in a separate housing mounted on pump. The valve is of the poppet type and is controlled by a spring whose tension can be varied by means of an external adjusting screw to provide any desired fuel pressure within the range of adjustment. This relief valve also incorporates a by-pass valve to allow fuel flow through pump when pump is inoperative.

27. EXTERNAL CLEANING AND INSPECTION.

a. Examine the unit for cracked housings and broken flanges. Check the relief valve assembly for tightness to main body. Check fittings for tightness.

28. DISASSEMBLY.

a. **Remove Valve Assembly.** Remove lock wire from relief valve screws and two pipe plugs (fig. 70). Remove lock screw and lock plate from drive end. Remove retainer. Remove seal, disk, drive shaft, spring, and two washers by hand. Remove front bearing. With a scribe, mark pump body and relief valve body on inlet side. The four vanes and pin will fall out. Remove relief valve assembly by removing four cap screws on corners of assembly.

b. **Disassemble Pump.** Heat rest of pump body to about 250°F. in an oven or oil bath to eliminate unnecessary wear on sleeve and bearings during disassembly. The sleeve and rear bearing can be removed by bumping parts out on a soft-wooden bench or block after body has been heated. Do not attempt to disassemble relief valve assembly.

29. CLEANING AND INSPECTION.

a. **General.** After disassembly, clean parts with dry-cleaning solvent and inspect carefully for damage and wear. All defective parts, as well as those indicating excessive wear, must be replaced (par. 22).

b. **Blades.** If sides of blades are rough or slightly scored, dress them carefully on a new, flat oilstone being careful to maintain original radius on edges. Smooth off any sharp corners at ends of blades which might score bronze bearings but do not make them round.

c. **Bearings.** Slight scoring of bronze bearings may be corrected by lapping carefully on a flat oilstone. Do not attempt to lap seal surface of front bearing.

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)

b. Replace Dowels and Studs. In case of any damage, the base dowels and idler gear stud may be removed and new ones pressed in place.

44. ASSEMBLY.

a. Assemble Ball Arm Head. Assemble ball arms on head with pins and cotter pins. Place head assembly in case and hold in position. Put oil pump idler gear on stud and drive gear on spline. Place gasket and base in position on case and attach with three machine screws. Press collar on spline end until all end play is eliminated but a free rotation of ball head is still possible.

b. Install Relief Valve. Place spring and valve in relief valve sleeve and slip retaining pin in end hole. Tighten assembly in case. Tighten plug and gasket in hole opposite relief valve.

c. Install Plunger and Linkage. Assemble floating lever and speed adjusting lever to speeder spring fork with pins and lock wire. Attach fork to spring top. Assemble spring seat and plunger. Place retaining pin in position and tap pin in center to bend it slightly and prevent it from falling out, Attach spring to seat. Slide bearing on plunger and carefully place plunger and attached parts in hole in ball arm head. Plunger must be free to move up and down in ball arm head. Install speed adjusting shaft sleeve and gasket by screwing into case. Place shaft in sleeve, and attach speed adjusting lever to shaft with a cotter pin. Install two seals, back to back, in sleeve end. Install spacer and gasket in case. Install terminal lever sleeve in case by pressing into position. Place terminal lever in position, and install two terminal shafts. Lock lever to shafts with cotter pins. Install a new core plug in short terminal shaft sleeve. Install two seals, back to back, in long terminal shaft sleeve end. Place droop adjusting bracket in position and lock in place with cap screw and washer.

d. Install Speed Stops and Cover. Install high speed stop and nut in cover. Install cover and gasket and attach with three machine screws and two washers.

45. INSTALLATION.

a. Install Governor. Place gasket and governor on studs and attach with four nuts (fig. 73). Be certain governor name plate faces engine.

b. Install Control Rods. Connect control rods with bolts running through yoke ends and secure with nuts and cotter pins.

c. Install Spring Controlled Levers. The two spring controlled levers are attached to their shafts by a taper pin and a cap screw. Drive taper pin in position, tighten cap screw and lock with lock wire

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)

b. Inspection. Inspect the pinion screw shaft for gummy deposits and remove with dry-cleaning solvent if present. Lubricate screw with light oil only.

58. DISASSEMBLY.

a. Remove Drive. Mark relative location of field ring, intermediate housing, and Bendix drive housing (fig. 78). Remove Bendix housing from intermediate housing. Remove bearing retainer and bearing. Unscrew Bendix drive set screw and slide drive off armature shaft.

b. Remove Intermediate Housing. Remove cap screws from intermediate housing and pull housing off shaft away from field ring. Remove oil seal retainers from each end of housing and remove seals, bearing and sleeve.

c. Remove Armature. Remove armature from field ring, being careful not to damage insulation or commutator.

d. Remove Brush Holder Housing. Mark location of stud and screws in brush holder housing. Also mark location of brush assemblies. Remove stud nuts, washers, cap screws and washer from brush holder housing end. Remove jumper and insulators. Mark relative location of field ring and brush holder housing. Remove band and remove brush holder housing from field ring.

e. Disassemble Field Ring. Remove bolts, nuts, and insulators, from side terminal. Remove eight screws from field ring and slide coil and pole piece out brush end.

f. Disassemble Brush Holder Housing. Remove two cap screws supporting each brush holder assembly and remove four assemblies. Remove bearing retainers, oil seal, sleeve, and bearing, from brush holder housing.

59. CLEANING AND INSPECTION.

a. Cleaning. Wash Bendix housing, brush holders, intermediate housing, field ring, band end and brush holder housing in dry-cleaning solvent. Clean Bendix housing bearing retainer, housing oil seal retainers, commutator end bearing retainer and seal retainer by washing. **CAUTION: Do not wash Bendix drive clutch in cleaning fluids and do not lubricate.** Clean drive clutch, armature, jumper and field coil by blowing with dry compressed air or by wiping with a clean cloth. Brushes may be cleaned with oil free gasoline if they are dried before being used. **CAUTION: Do not soak brushes.** Any caked substances may be removed with No. 00 flintpaper. Do not change brush size by sandpapering and do not round contact surface of brush. Wash and oil bearings after cleaning. Wash nuts, washers, screws and studs in dry-cleaning solvent. If commutator becomes slightly

ORDNANCE MAINTENANCE — ORDNANCE ENGINE MODEL RD-1820 (CATERPILLAR)

Manufacturer's Part Number	Name	Number Required
CME-5A2182	Protector, cover for engine.....	1
CME-5A2342	Protector, crankshaft end	1
WAC-800986		
CME-5A2159	Protector, master and articulated rods.....	9
CME-5A1442	Protector plug, fuel lines.....	18
CME-5A2305	Puller, cam bearing.....	1
WAC-84535		
CME-5A2304	Puller, crankshaft bearing	1
WAC-800377		
CME-5A2299	Puller, crankshaft rear main bearing.....	1
WAC-84559		
CME-5A2298	Puller, crankshaft front main bearing inner race, removing (used with WAC-85464)....	1
WAC-84562		
CME-5A2276	Puller, rocker arm hub bolt bushing, removing and installing	1
WAC-800099		
CME-5A2263	Puller, supercharger impeller, removing and in- stalling (used with WAC-800307).....	1
WAC-800304		
CME-5A2282	Puller, valve tappet guide, installing.....	1
WAC-84802		
CME-5A2275	Reamer, exhaust valve guide cylinder hole, hand expansion (0.005 oversize).....	1
WAC-83477		
CME-5A2272	Reamer, intake valve guide cylinder hole, hand expansion (0.7233 diam.) (0.005 oversize) ..	1
WAC-800341		
CME-5A2280	Reamer, rocker arm hub bolt bushing.....	1
WAC-800108		
CME-5A2301	Screw, crankshaft rear, removing and installing (used with WAC-84765).....	1
WAC-84699		
CME-5A2228	Sling, lifting engine assembly.....	1
CME-5A2300	Spreader, crankshaft, rear crankcheek (used with WAC-84699)	1
WAC-84765		
CME-5A2302	Stop, crankshaft front and rear counterweight bushing, installing	1
WAC-83445		
CME-5A2155	Stud assembly, remove and replace clutch springs	4
CME-5A2164	Timing disk, fuel pump lifter and engine valves	1
CME-5A2309	Wedges, support master rod flanges.....	2
WAC-800282		
CME-5A2306	Wrench, crankcase front main section to rear section nuts	1
WAC-84356		
CME-5A2339	Wrench, crankshaft cheek capscrew, remove and replace	1
WAC-80309		

TECHNICAL MANUAL

ORDNANCE MAINTENANCE

AXLES, PROPELLER SHAFTS, AND WHEELS FOR
BOMB SERVICE TRUCK M6 AND 1½-TON 4 X 4 TRUCKS
(CHEVROLET), INCLUDING TELEPHONE EARTH
BORER (K-44)

CHANGES }
No. 1 }

WAR DEPARTMENT.

WASHINGTON 25, D. C., 2 March 1945

TM 9-1765A, 15 December 1942, is changed as follows:

Change title of manual to read: AXLES, PROPELLER SHAFTS,
AND WHEELS FOR BOMB SERVICE TRUCK M6 AND 1½-TON
4 X 4 TRUCKS (CHEVROLET), INCLUDING TELEPHONE
EARTH BORER (K-44).

Chapter 6 is added as new material; present chapter 6 is changed
to Appendix.

Chapter 6 (Added)

EARTH BORER EQUIPMENT HD

Section I

GENERAL

Description and operation----- Paragraph
80

80. DESCRIPTION AND OPERATION.

a. **Description** (figs. 57 and 58). The earth borer equipment HD is a machine designed for digging holes in various types of soil, by power, for setting telephone poles and placing guy anchors. The machine is equipped with an integral derrick for setting telephone poles after the hole has been dug. The equipment includes the main supporting case tube, which is a steel shell attached to two mounting bases with cap screws. This steel shell supports the clutch case, which houses the feed and driving clutches, and brakes at one end, and supports the intermediate and boring cases at the other end. These latter cases project to the rear of and overhang the last body platform cross bearer. The main supporting case tube also houses the main drive and feed shafts. The intermediate case contains the intermediate drive and feed gear trains and has mounted on it the two leveling worms and wheel drives which serve when the main boring case is shifted into position. The boring case contains the final feed and drive gears, and the rack shaft boring head. The rack shaft, on which the earth auger

*These changes, together with C 1 (when published), TM 9-805, supersede TM 11-364, 24 September 1942.

(6) Install drive sprocket key on shaft and install sprocket with washer, nut, and cotter pin.

Note. When replacing bearing retainer oil seals, press in new seals so edge of leather will be toward sprocket shaft gear.

c. Install Clutch Sprocket Intermediate Gear Assembly.

(1) With clutch case removed as explained in paragraph 81a (5), and with clutch sprocket gear previously installed proceed with assembly.

(2) If bushing has been removed from gear, press bushing into gear.

(3) Place clutch sprocket intermediate gear into position inside clutch case, install shaft, and lock with nut and cotter pin.

d. Assemble Clutch and Brake Assembly and Install in Main Supporting Clutch Case.

(1) Before beginning assembly of clutch and brake assembly, install first reduction drive and feed shaft assemblies in machines as described in a above.

(2) When assembling the feed clutch and brake assembly on feed shaft, start by slipping the brake spacer and feed brake shell over the clutch and brake hub; then install an internal-toothed clutch plate against spacer; next install external-toothed clutch plate. Continue to install clutch plates alternately until a total of nine external-toothed plates have been installed. Complete this assembly with two internal-toothed plates.

(3) Install throw collar and commence assembly of plates with two internal-toothed plates; next install external-toothed plate. Continue assembly of clutch plates until a total of nine external-toothed plates have been assembled. Complete assembly with one internal-toothed plate.

(4) Install clutch spacer with the flat side against the plates; then install main drive gear and clutch shell bearing, locking washer and feed shaft nut. Tighten nut securely and bend over tang of locking washer to lock the nut.

(5) Assemble main drive gear and clutch shell over shell bearing. Install drive sleeve on drive shaft, and seat clutch shell bearing in the main drive gear and clutch shell.

(6) Install spacer and then install internal-toothed clutch plate against spacer, then assemble an external-toothed plate. Continue the assembly of plates alternately until a total of nine external-toothed plates have been installed. Complete assembly with two internal-toothed plates.

(7) Install throw collar and commence assembly of plates with two internal-toothed plates, then install an external-toothed plate. Continue assembly of plates until a total of nine external-toothed plates

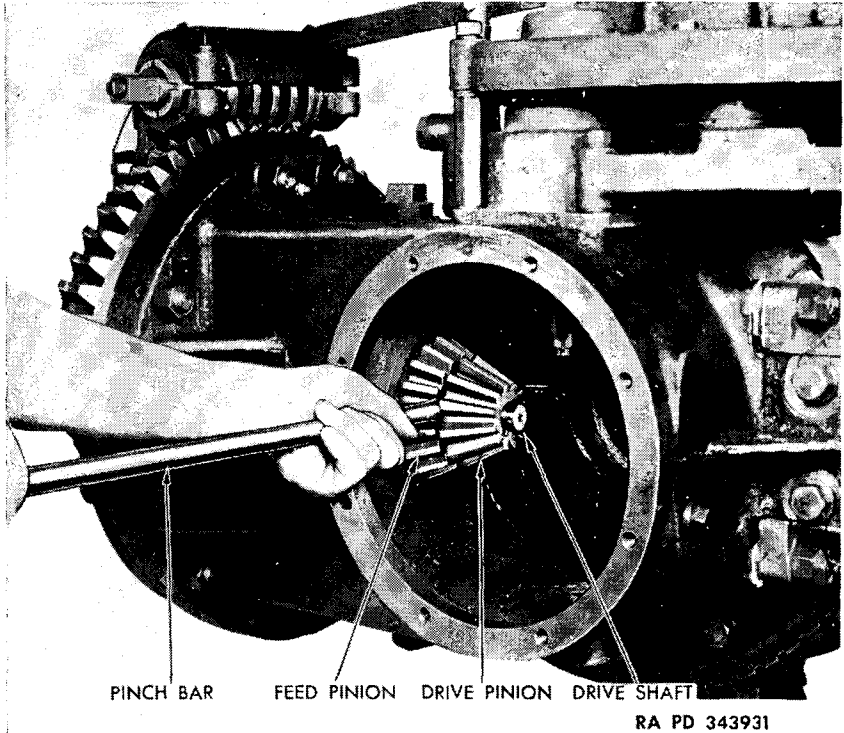


Figure 69—Removing First Reduction Drive Pinion

c. Adjustment.

(1) Install intermediate gear assembly and check backlash between first reduction drive pinion and first reduction drive gear. The backlash should be from 0.010 to 0.015 inch.

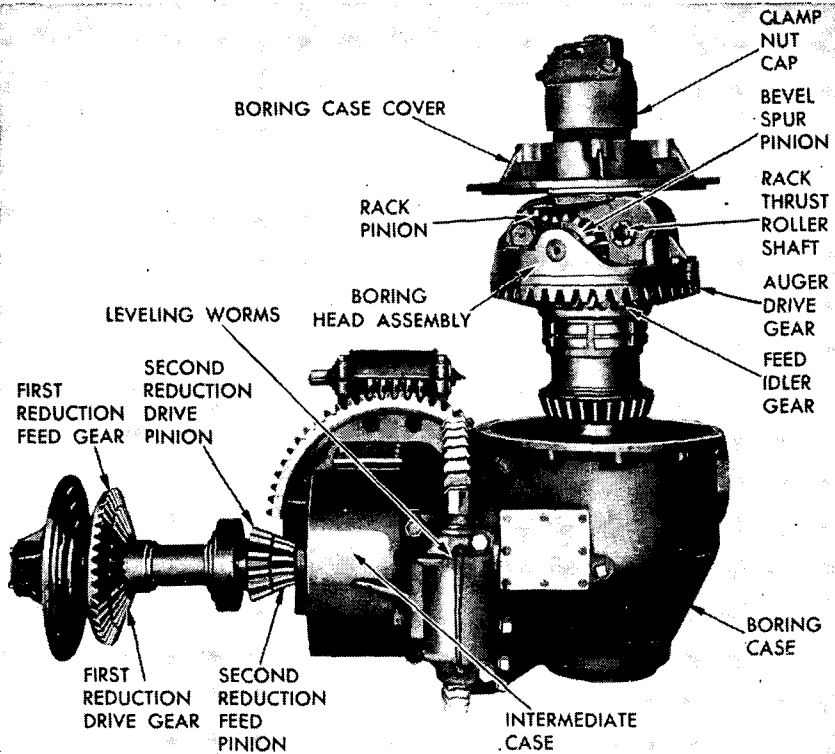
(2) To adjust the backlash, remove the clutch case cap from rear of the clutch case. Remove cotter pin and nut from the drive clutch shaft, then raise the tang of the locking washer and remove the nut from the clutch drive sleeve. Adjust the backlash as follows:

(3) If the backlash is too great, add shims between the shoulder on the drive shaft and the inside of the clutch drive sleeve nut. (See fig. 70.)

(4) If the backlash is too tight and there are shims on the drive shaft, remove the number of shims necessary to secure proper backlash.

(5) If the backlash is too tight and the drive shaft extends beyond the clutch drive sleeve as shown in figure 71, install the necessary shims between the clutch drive sleeve bearing locking washer and nut to secure proper backlash.

(6) Replace shaft nut, cotter pin, and clutch case cap.



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Figure 79—Boring Case and Intermediate Case, Disassembled

b. Disassembly of Boring Head Assembly (fig. 79).

(1) When disassembling boring head assembly, it is good practice to bolt the boring head securely to a bench with a through bolt passing through the boring head to hold it rigidly in place. Remove nut from thrust roller shaft (fig. 79), and remove bearing cap. Remove thrust roller and its roller bearings through the opening created by the removal of the cap. Drive the shaft out with a brass drift.

(2) After rack thrust roller has been removed as described in (1) above, remove cone point lock screw and drive shaft out through thrust roller bearing cap opening. Lift out bevel spur pinion (fig. 79) with roller bearings.

AXLES, PROPELLER SHAFTS, AND WHEELS

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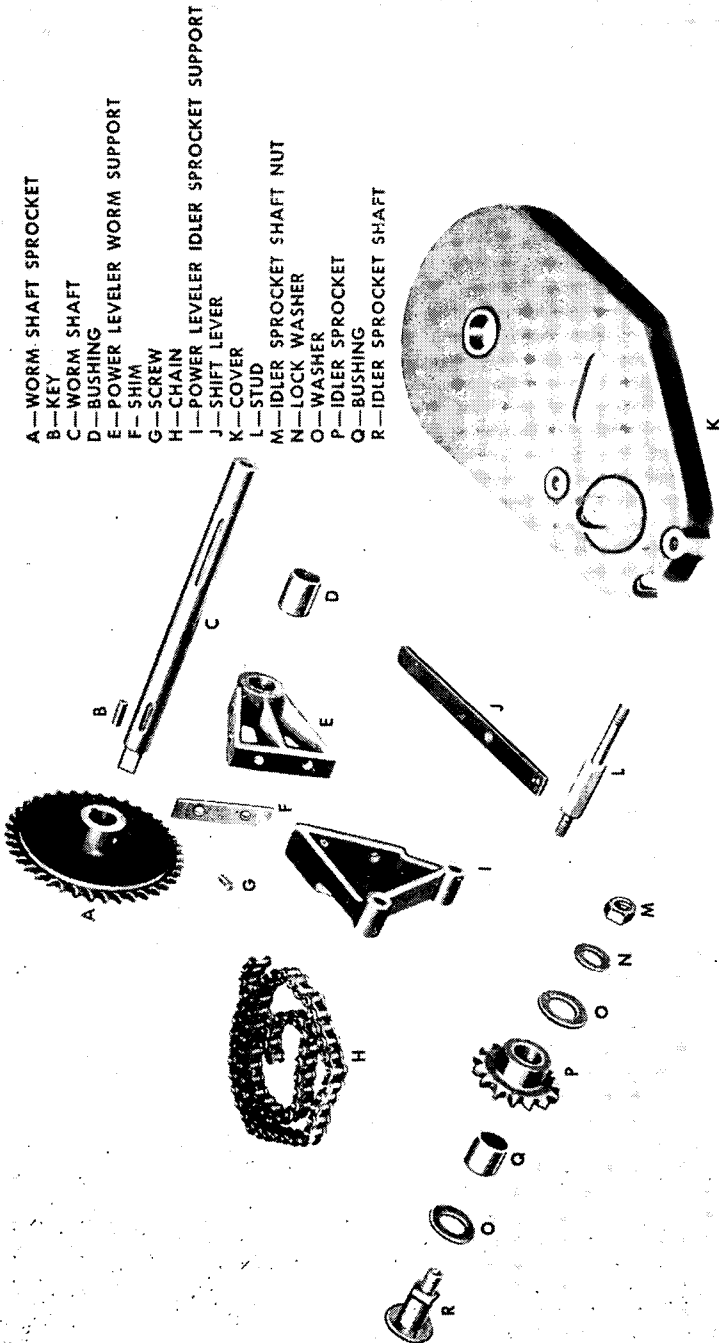


Figure 87—Power Leveler Drive Assembly, Disassembled

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