

**45"**  
**ENGINE OVERHAUL**  
**MANUAL**  
**SOLO 45" MODEL**  
**WLA**  
**1929-1952**

# **SERVICE MANUAL**

APPLYING TO  
THE FOLLOWING  
45 MODELS

1941-1952

Side Valve Engine Models  
45 cu. in. (750 c.c.)

Basic Drive Train  
1941 and Later Servi-Car

Generally to  
1929-40 45 models



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## CHAPTER 1

### INTRODUCTION

#### 1. SCOPE.

a. The instructions contained in this manual are for the information and guidance of personnel charged with the maintenance and repair of Harley-Davidson motorcycle, model WLA. These instructions are supplementary to field and technical manuals prepared for the using arm. This manual does not contain information which is intended primarily for the using arm, since such information is available to ordnance maintenance personnel in 100-series TM's or FM's.

b. This manual contains a description of, and procedure for, disassembly, inspection and repair of engine, fuel system, ignition system, generating system, transmission and clutch, and chassis.

c. TM 9-879 contains the replacement instructions of many components of this vehicle. This information is not repeated in this manual.

#### 2. MWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD.

a. **Description.** Every vehicle is supplied with a copy of A.G.O. Form No. 478, which provides a means of keeping a record of each MWO completed or major unit assembly replaced. This form includes spaces for the vehicle named and U.S.A. Registration No., instructions for use, and information pertinent to the work accomplished. It is very important that the form be used as directed and that it remain with the vehicle until the vehicle is removed from service.

b. **Instructions for Use.** Personnel performing modifications or major unit assembly replacements must record clearly on the form a description of the work completed and must initial the form in the columns provided. When each modification is completed, record the date, hours and/or mileage, and MWO number. When major unit assemblies, such as engines, transmissions, transfer cases, are replaced, record the date, hours and/or mileage and nomenclature of the unit assembly. Minor repairs and minor parts and accessory replacements need not be recorded.

c. **Early Modifications.** Upon receipt by a third or fourth echelon repair facility of a vehicle for modification or repair, maintenance personnel will record the MWO numbers of modifications applied prior to the date of A.G.O. Form No. 478.

## CHAPTER 2

### OVERHAUL OF ENGINE IN VEHICLE

#### Section 1

### DESCRIPTION AND ENGINE DATA

#### 3. DESCRIPTION AND ENGINE DATA.

a. **Description.** The vehicle is powered by a two-cylinder, V-type, L-head gasoline engine, operating on four-stroke, four-cycle principle. The bearings, pistons and rings, cylinder walls, bushings and gears are lubricated by a force-feed circulating oil system. Engine oil supply is maintained in a separate tank. Tolerances and fits are held to close standards, calling for precise and fine workmanship on the part of the mechanic.

#### b. Engine Data.

Engine type	V-type, L-head
Number of cylinders	2
Engine cooling	Air
Cylinder bore	2 $\frac{3}{4}$ in.
Stroke	3 $\frac{13}{16}$ in.
Displacement	45.12 cu in.
Horsepower (N.A.C.C. rating)	6.05
Compression ratio	5.0 to 1
Inclination of cylinders	45 deg
Lubrication	Circulating oil system
Fuel, gasoline	72 octane or higher
Engine (power unit) weight	114 lb
Rotation (sprocket side)	Counterclockwise
Ignition	Battery

## CHAPTER 2 OVERHAUL OF ENGINE IN VEHICLE (Cont'd)

### Section II

#### REMOVAL OF CYLINDERS AND PISTON ASSEMBLIES

##### 4. PRELIMINARY INSTRUCTIONS.

a. **General.** When an engine needs repair, it is not always possible to definitely determine beforehand whether repair can be made with only upper end disassembled, or whether engine must be completely disassembled for lower end repair. Most commonly only upper end repair is needed (valves, rings, pistons, etc.) and it is recommended procedure to first disassemble upper end only, allowing engine base to remain in frame. After disassembling upper end only, be sure to inspect connecting rod bearings for wear (par. 6). If connecting rod bearings are worn and must be replaced, refer to chapter 3.

b. **Emergency Piston and Ring Service.** Need of replacement of rings, or possibly pistons and rings, is indicated by loss of normal compression, loss of power, abnormal oil consumption, excessive exhaust smoke and piston slap or knock. When pistons develop excessive clearance and slap due to wear or damage, and cylinders are found worn more than 0.002-inch, smooth and true up cylinder bore by honing, or boring and honing, to the next regular oversize piston step. However, piston slap alone, due to wear and excessive cylinder-piston clearance, does not necessarily mean poor and undependable performance. A good compression seal is the requirement for good performance. Good compression depends on smooth cylinders and proper clearance between piston rings and grooves.

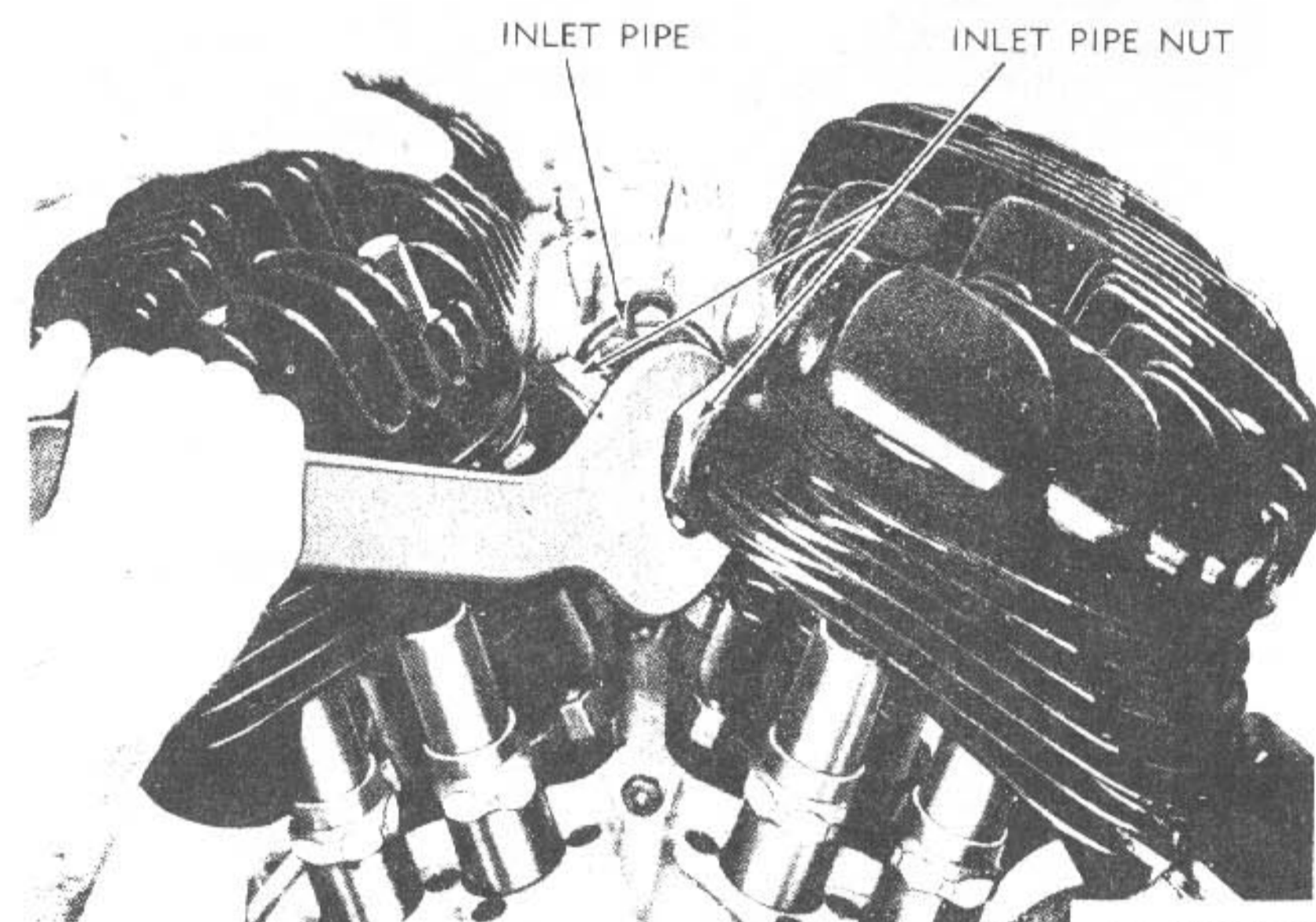
c. **Test for Leaky Valves and Worn Piston Rings.** Before making this test, see that oil is in the tank, spark plugs are tight, cylinder head bolts are tight, valve tappets have sufficient clearance and that engine is warm. It is difficult to determine whether valves or rings (or both) are at fault when compression is poor. In either case, the cylinders must be removed to do a first class job.

(1) **COMPRESSION TEST.** Operate engine until it is thoroughly warmed up and with the ignition switch off, crank the engine slowly, placing entire weight of the body on the starter crank. Engine compression should offer some resistance to the weight of an average-size rider before the starter crank passes through complete range of its travel. If the engine offers little resistance to the starter crank in testing either or both cylinders, it is an indication that compression is not adequate in one or both cylinders. In vehicle operation engine will lack power, overheat, fuel and oil consumption will be excessive and engine performance will be sluggish in general.

d. **Abnormal Engine Noise.** Owing to constructional design of the motorcycle (power and drive units are exposed) certain mechanical noises not noticeable in a motorcar or truck are evident in normal

#### REMOVAL OF CYLINDERS AND PISTON ASSEMBLIES

operation. Many operational noises may sound like they originate in the engine. For example: Front drive chain too loose or too tight will cause scraping, grinding, or pounding noise, besides causing jerky operation. Loose engine mountings will cause thumping, pounding noises. Transmission loose on its frame mounting base will cause pounding noise. Loose valve tappets will cause excessive noise in the engine gear case. Incorrect spark timing (advanced) will cause knocking and engine roughness. Therefore, see that all units are securely mounted and correctly adjusted before attempting to diagnose engine noises. Too many motorcycles have been deadlined and engines and transmission units exchanged because simple preventive maintenance service that would eliminate abnormal noises, has been neglected.



RA PD 310293

**Figure 1—Removing Carburetor and Intake Pipe Assembly with Wrench (41-W-1570-10)**

(1) **UPPER END NOISES.** Operate engine until it is thoroughly warmed up and idle engine from closed throttle to fast idling speed with vehicle standing. Listen for abnormal metallic noises that would indicate loose pistons, loose piston pins and possibly broken piston rings. Operate vehicle on the road up to 25 or 30 miles per hour and listen for metallic knocking sound that would be caused by loose pistons, piston pins or loose rings. Observe knocking (ping) in engine when accelerating that would be caused by excessive carbon deposits. **NOTE:** Spark control must be correctly adjusted and operated properly, to distinguish between carbon and spark knocks.



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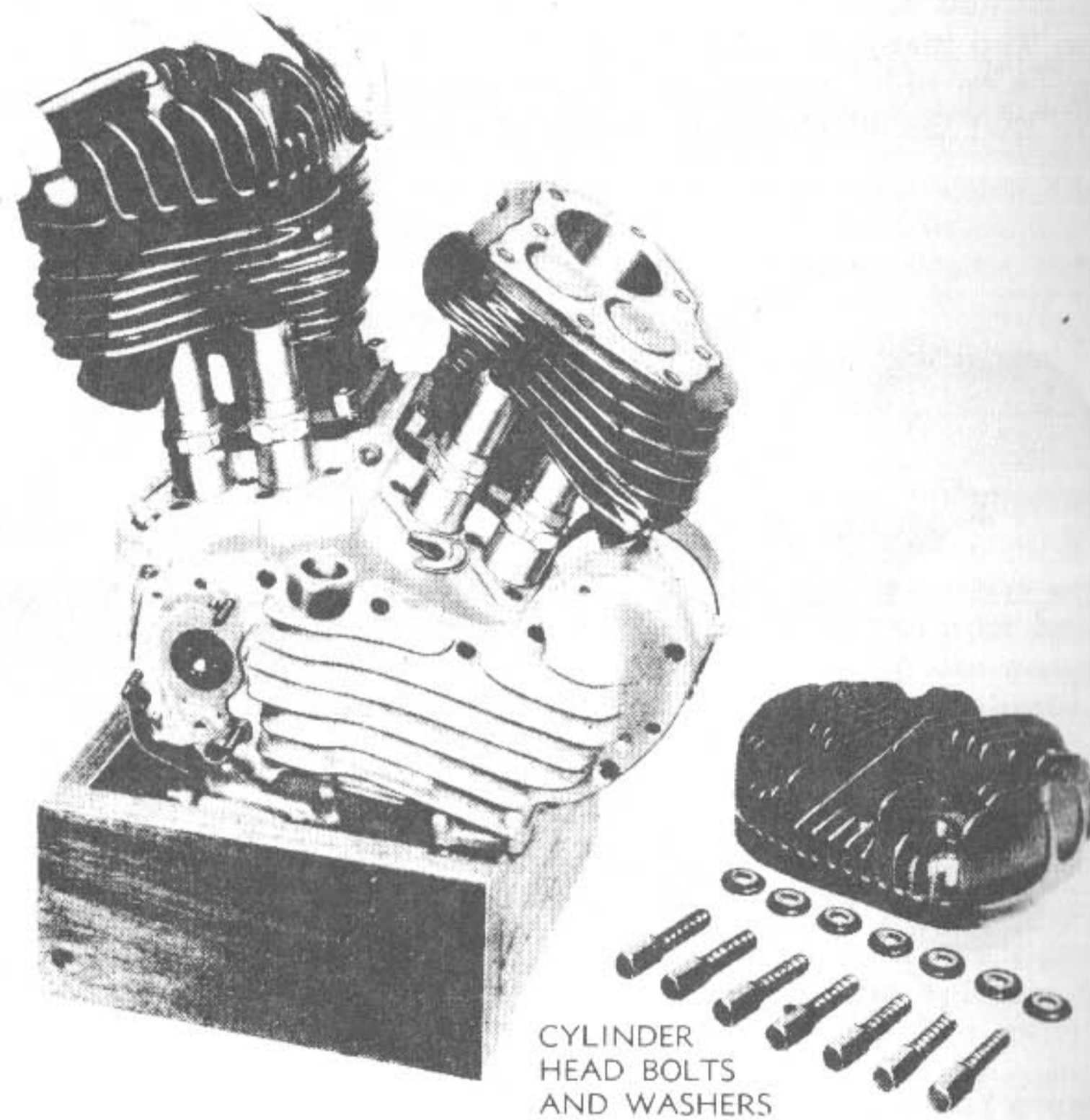
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(2) **ENGINE BASE NOISES.** Before attempting to diagnose engine base noises, make sure that engine and transmission mountings are secure, front and rear drive chains are adjusted correctly, and valve tappets have specified clearance. Operate engine from closed throttle to fast idling speed and listen for abnormal metallic noise in the vicinity of the crankcase and gear case. With vehicle in operation at speeds from 15 to 30 miles per hour, listen for thumping, pounding, or scraping noise that may indicate engine main bearing trouble.



RA PD 310295

**Figure 2—Removing Cylinder Head Bolts with Wrench (41-W-1525)**

## 5. REMOVAL.

a. **Remove Instrument Panel and Tanks.** Refer to TM 9-879 for instructions.

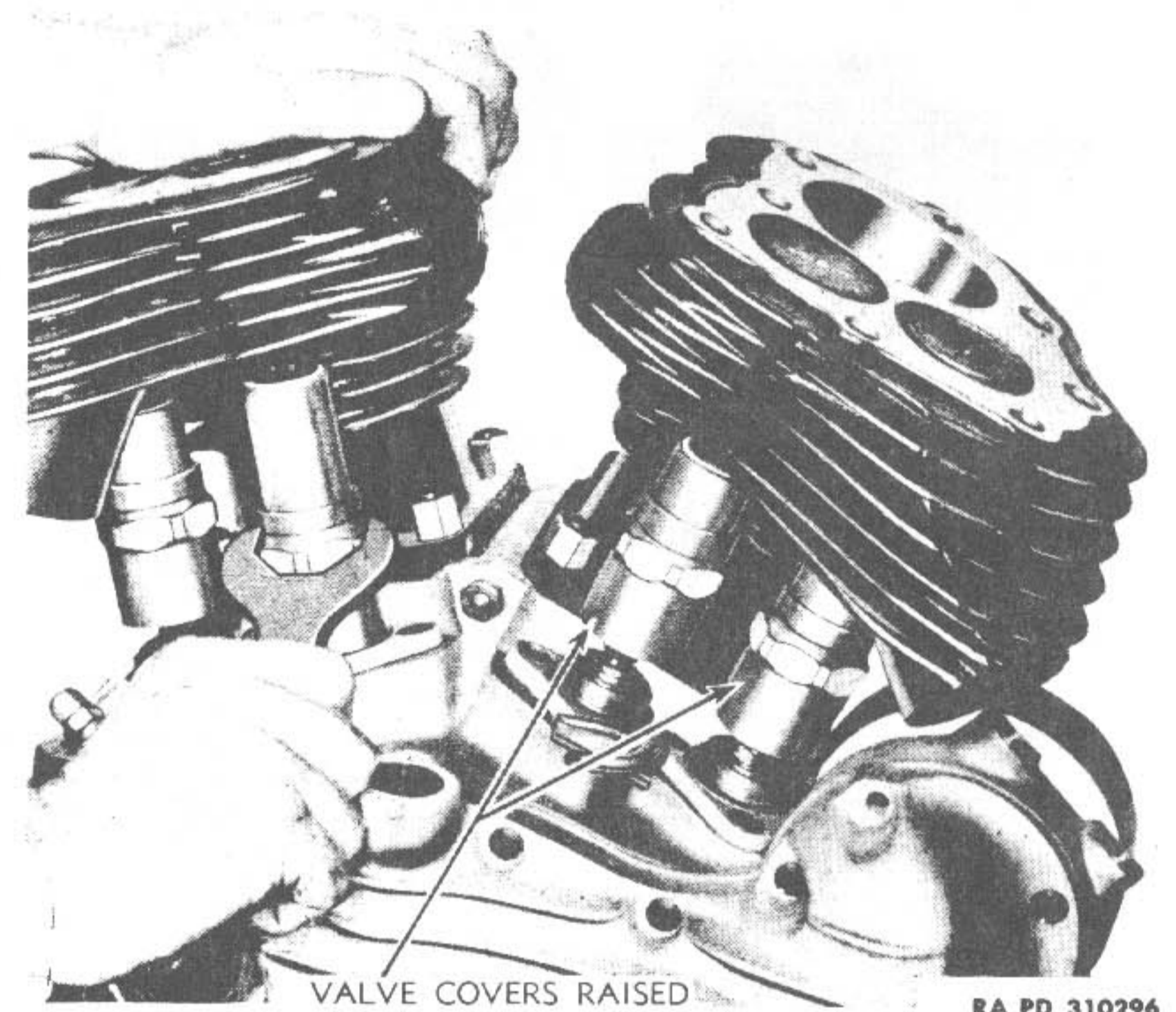
b. **Remove Carburetor and Intake Pipe (fig. 1).** Disconnect throttle control wire at carburetor. Disconnect air intake hose fitting from carburetor and leave attached to hose. Loosen air hose clamp at air cleaner and remove hose with carburetor fittings. Remove fuel line and strainer from carburetor bowl. With special wrench (41-W-1570-10), loosen and unscrew inlet pipe nuts from

## REMOVAL OF CYLINDERS AND PISTON ASSEMBLIES

cylinder nipples; then remove carburetor and inlet assembly from engine.

c. **Remove Cylinder Heads (fig. 2).** Remove spark plugs before removing cylinder heads. Use special wrench (41-W-1525) and remove cylinder head bolts. Remove bolt which secures cylinder head bracket to frame.

d. **Remove Cylinders.** Clean crankcase around cylinder bases and valve covers to prevent dirt from entering crankcase when lifting cylinders.



**Figure 3—Freeing Valve Covers with Wrench (41-W-3617)**

(1) Use valve cover wrench (41-W-3617) to loosen and unscrew lower valve covers (fig. 3). To facilitate lifting valve covers, and prevent damage to packing gaskets, use small amount of light oil around top edge of covers.

(2) Disconnect spark control wire at circuit breaker lever.

(3) Remove nut and bolt from clamp securing front exhaust pipe to right footboard side bar.

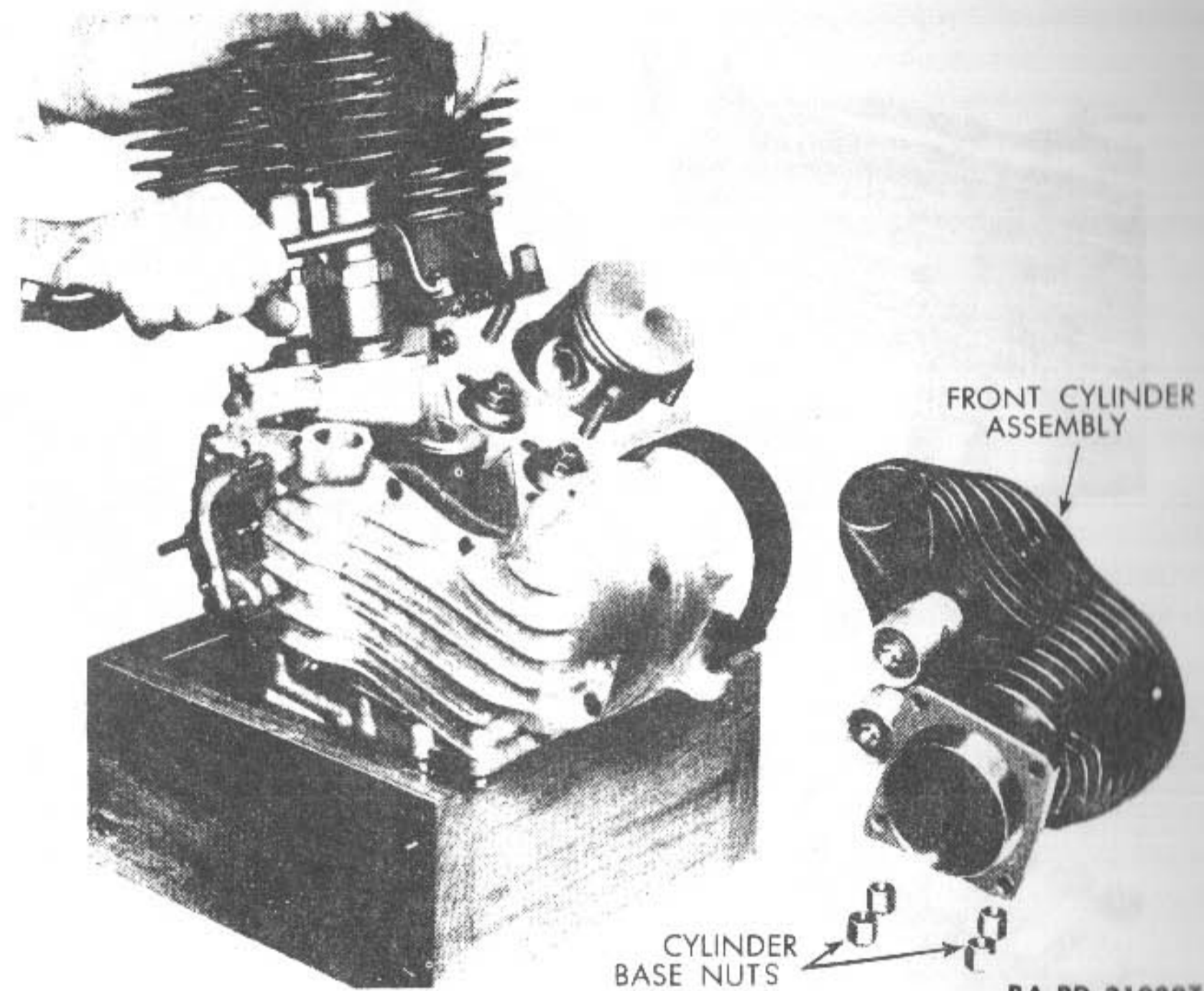
(4) Use special cylinder base nut wrench (41-W-872-10) and remove all base nuts (fig. 4), except one on rear cylinder. While crank-

ing engine to raise front piston, raise front cylinder enough to place clean rag over crankcase opening. This will prevent dirt or any pieces of broken rings from falling into crankcase. Crank engine to locate front piston at bottom of stroke, then lift front cylinder upward and free of engine.

(5) Remove remaining stud nut from rear cylinder and remove rear cylinder in same manner front cylinder was removed.

**e. Remove Pistons.**

(1) Remove lock ring from slotted end of piston pin. Slot permits use of screwdriver blade underneath ring to pry and force it off of



**Figure 4—Removing Cylinder Base Nuts with Wrench (41-W-872-10)**

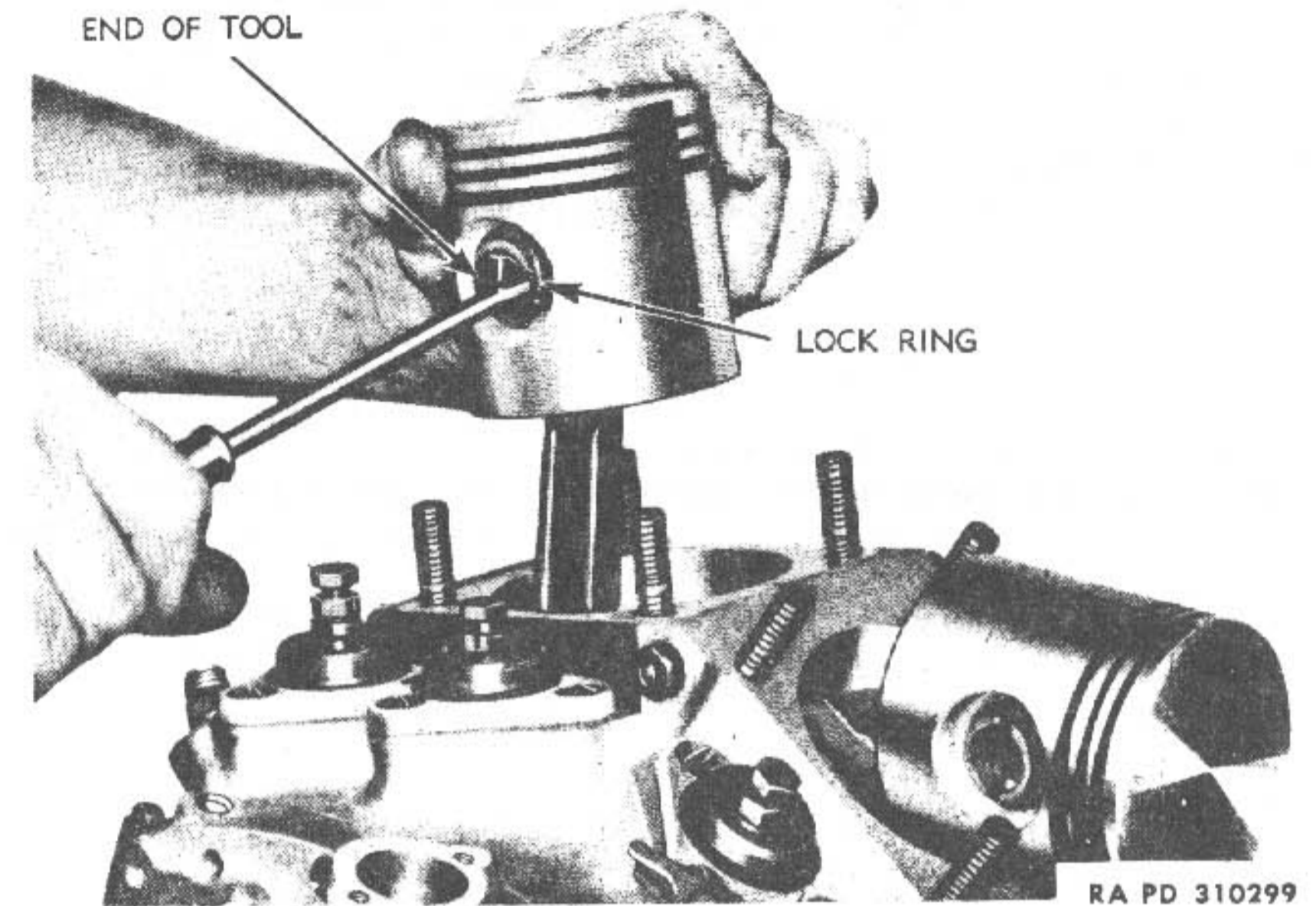
pin. Special tool (41-T-3260) will serve as a rest for the screwdriver (fig. 5).

(2) Use a soft drift slightly smaller ( $25/32$  in. dia) than the piston pin and drift pin (with light hammer blows) out of piston, taking care not to damage pin, piston bosses, or bend the connecting rod.

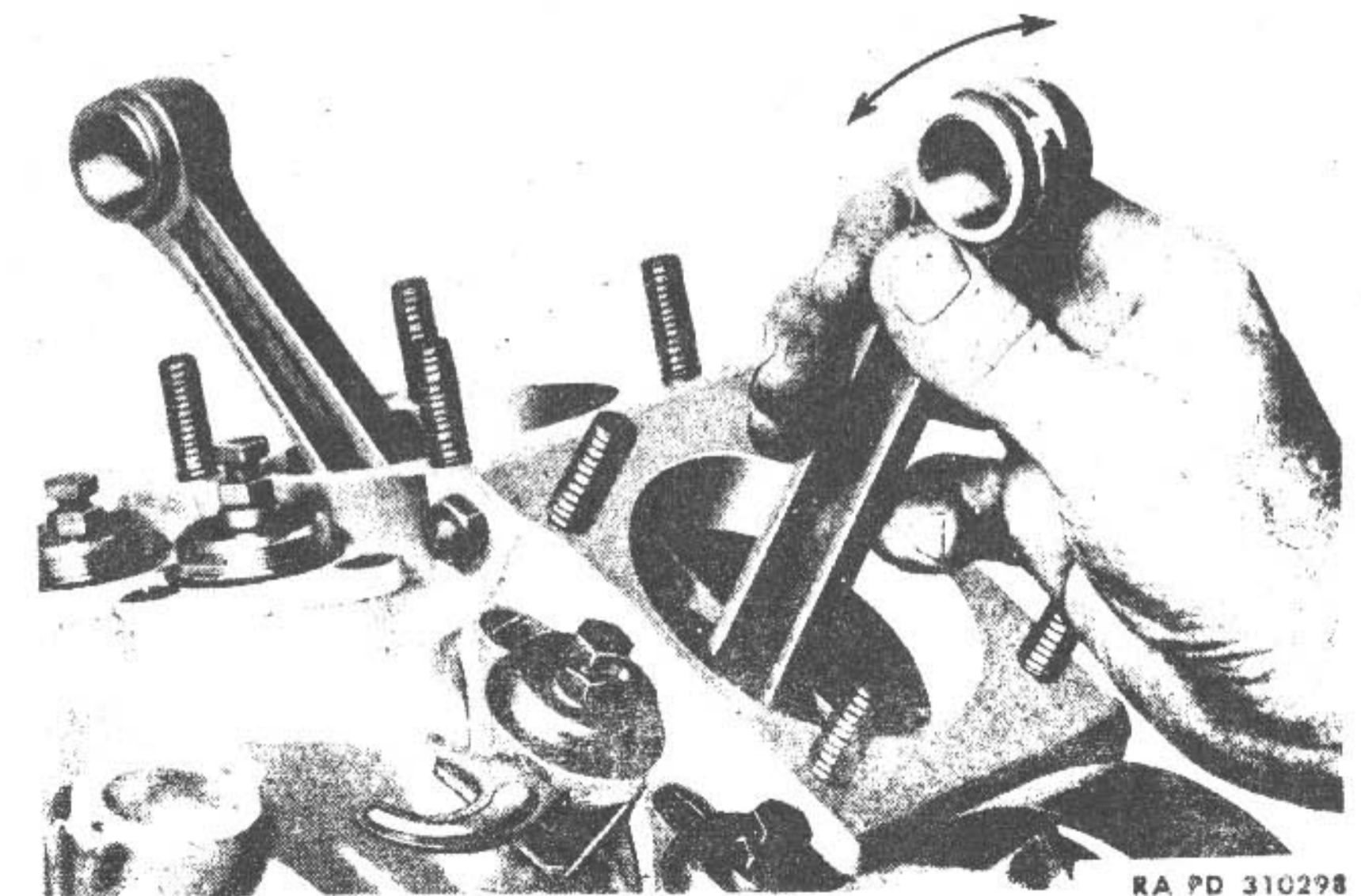
**6. INSPECTION OF CONNECTING ROD BEARINGS FOR WEAR.**

**a. Inspect Rods for Up and Down Play and Upper End Side Shake (fig. 6).** When appreciable up and down play is found and

**REMOVAL OF CYLINDERS AND PISTON ASSEMBLIES**



**Figure 5—Removing Lock Ring from Piston Pin, Using Tool (41-T-3260)**



**Figure 6—Inspecting Connecting Rod for Bearing Play**

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