

TM 9-1731G

RESTRICTED

WAR DEPARTMENT

TECHNICAL MANUAL



ORDNANCE MAINTENANCE

**HYDRAULIC TRAVERSING
MECHANISM (OILGEAR) FOR
MEDIUM TANKS M4 AND
MODIFICATIONS**

MAY 8, 1943

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**ORDNANCE MAINTENANCE
 HYDRAULIC TRAVERSING MECHANISM (OILGEAR)
 FOR MEDIUM TANKS M4 AND MODIFICATIONS**

Prepared under the direction of the
 Chief of Ordnance

(with the cooperation of The Oilgear Company)

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**ORDNANCE MAINTENANCE—HYDRAULIC TRAVERSING MECHANISM
(OILGEAR) FOR MEDIUM TANKS M4 AND MODIFICATIONS****Section I****INTRODUCTION**

	Paragraph
Scope	1
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1. SCOPE.

a. This manual is published for the information and guidance of ordnance maintenance personnel. It contains detailed instructions for inspection, disassembly, assembly, maintenance, and repair of the hydraulic traversing mechanism on the Medium Tanks M4 and modifications supplementary to those in the Field and Technical Manuals prepared for the using arm. Additional descriptive matter and illustrations are included to aid in providing a complete working knowledge of the materiel.

2. ARRANGEMENT OF MANUAL.

a. Section II gives a general description of the operation of the system as a whole and section III covers the trouble shooting of the components in the tank. Sections IV through IX are devoted to the overhaul of the components. The references are listed in the last section of the manual.

3. NATURE OF MATERIEL.

a. The information for the operation of the turret traversing mechanism and the using arm maintenance is covered in the pertinent operator's manual. This equipment is used to traverse the turret by hydraulic means.

Section II

GENERAL DESCRIPTION

	Paragraph
Description	4
Description of components.....	5
Operation of mechanism.....	6
Reference to operator's manual.....	7

4. DESCRIPTION (figs. 1 and 2).

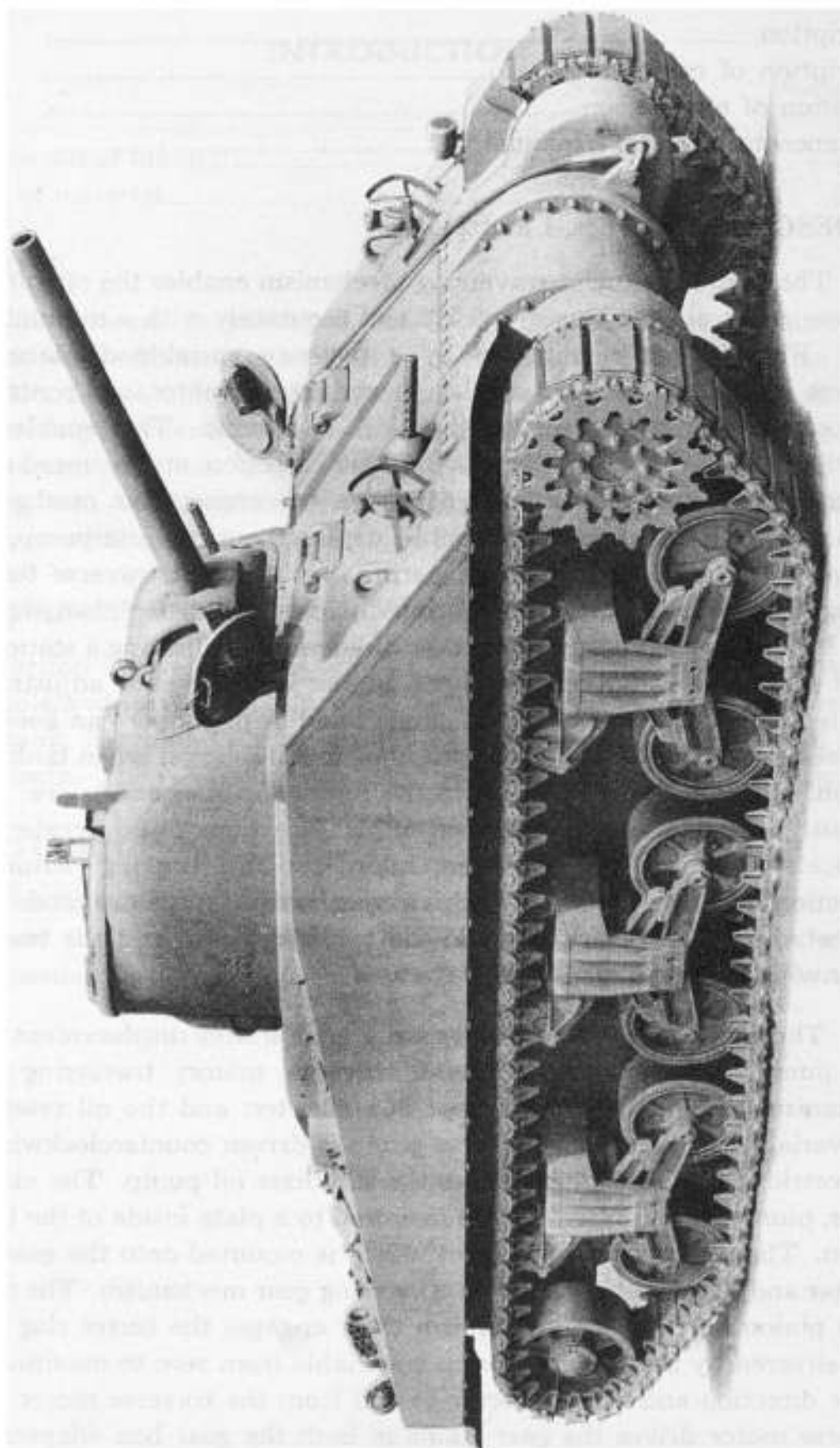
a. The hydraulic turret traversing mechanism enables the operator to traverse and train the turret quickly and accurately with a minimum of effort. Fluid power is supplied by a two-way variable displacement traverse pump to a constant displacement traverse motor, and controlled by a convenient hand grip integral with the pump. This enables the turret to be traversed 360 degrees in either direction, at any speed up to maximum, through a gear box adapter, a traversing gear mechanism, and a ring gear. The two-way variable displacement traverse pump, with its hydraulic servo-motor control, permits rapid turret traverse for following a fast moving target. It permits quick reversal for changing targets. It permits slow rotation in either direction for following a stationary target when tank is in motion or when gunner is making fine adjustments with telescopic sights. Through a single hand grip, gunner can keep the guns accurately sighted on a stationary or moving target when tank is in motion. Characteristics inherent in the hydraulic mechanism are: Continuously variable speed control in either direction; rapid acceleration or deceleration in either direction; hydro-dynamic braking; automatic protection against overloading drive mechanism; pressure and flood lubrication of all working parts in the traverse pump and the traverse motor with oil in the system.

b. The principal parts of the system are: Variable displacement traverse pump; constant displacement traverse motor; traversing gear mechanism and manual drive; gear box adapter; and the oil reservoir. The variable displacement traverse pump is driven counterclockwise by an electric motor which also drives the stabilizer oil pump. The electric motor, pump, and oil reservoir are mounted to a plate inside of the turret basket. The constant displacement motor is mounted onto the gear box adapter and both are bolted to the traversing gear mechanism. The turret drive pinion on the gear mechanism shaft engages the turret ring gear. Oil delivered by the traverse pump is variable from zero to maximum in either direction and flows directly to and from the traverse motor. The traverse motor drives the gear trains in both the gear box adapter and gear mechanism which, in turn, rotate the turret.

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RA PD 14378

Figure 1 — Three-Quarter Right Front Medium Tank M4

GENERAL DESCRIPTION

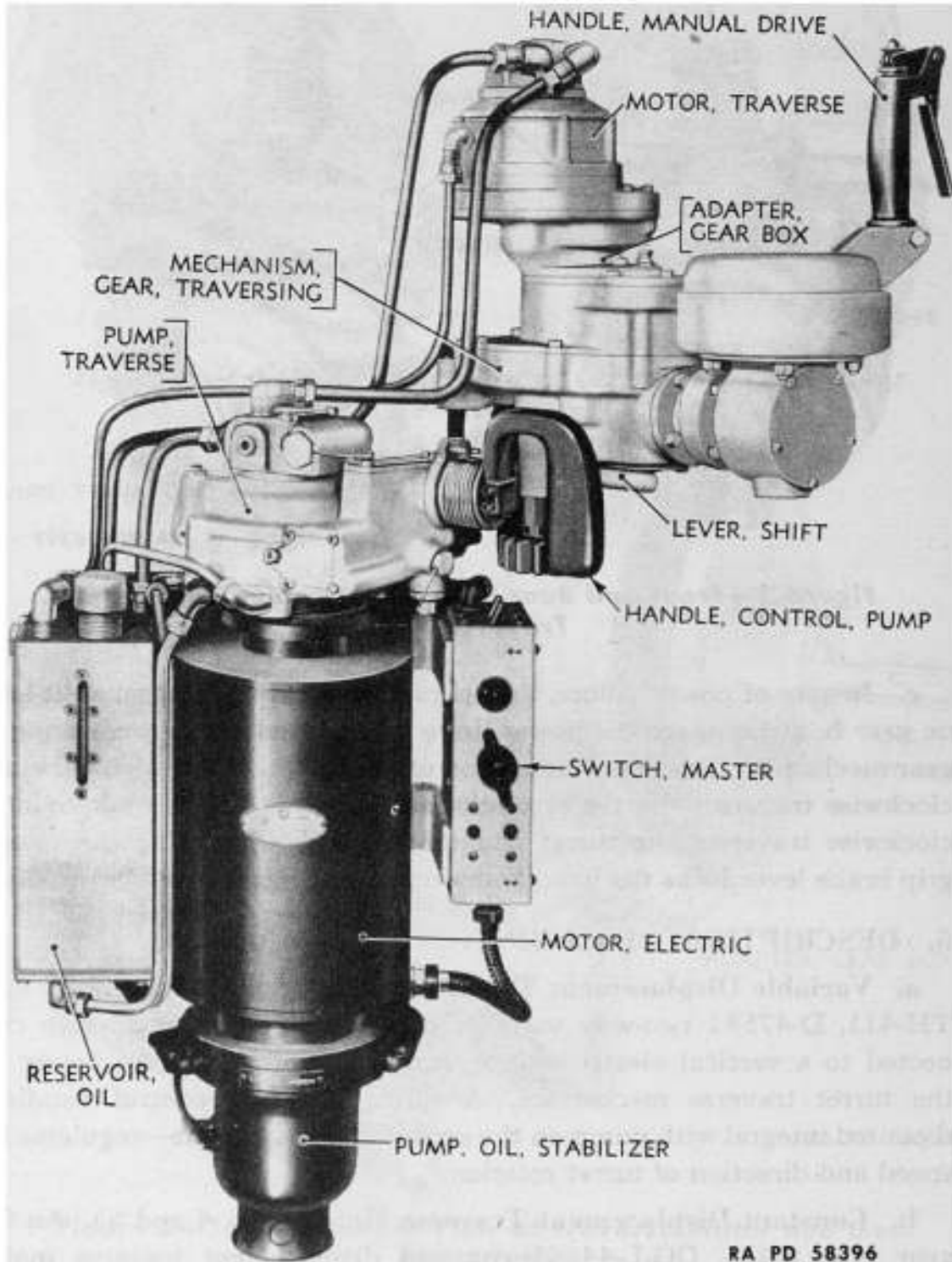


Figure 2 – Hydraulic Turret Traversing Mechanism Installation

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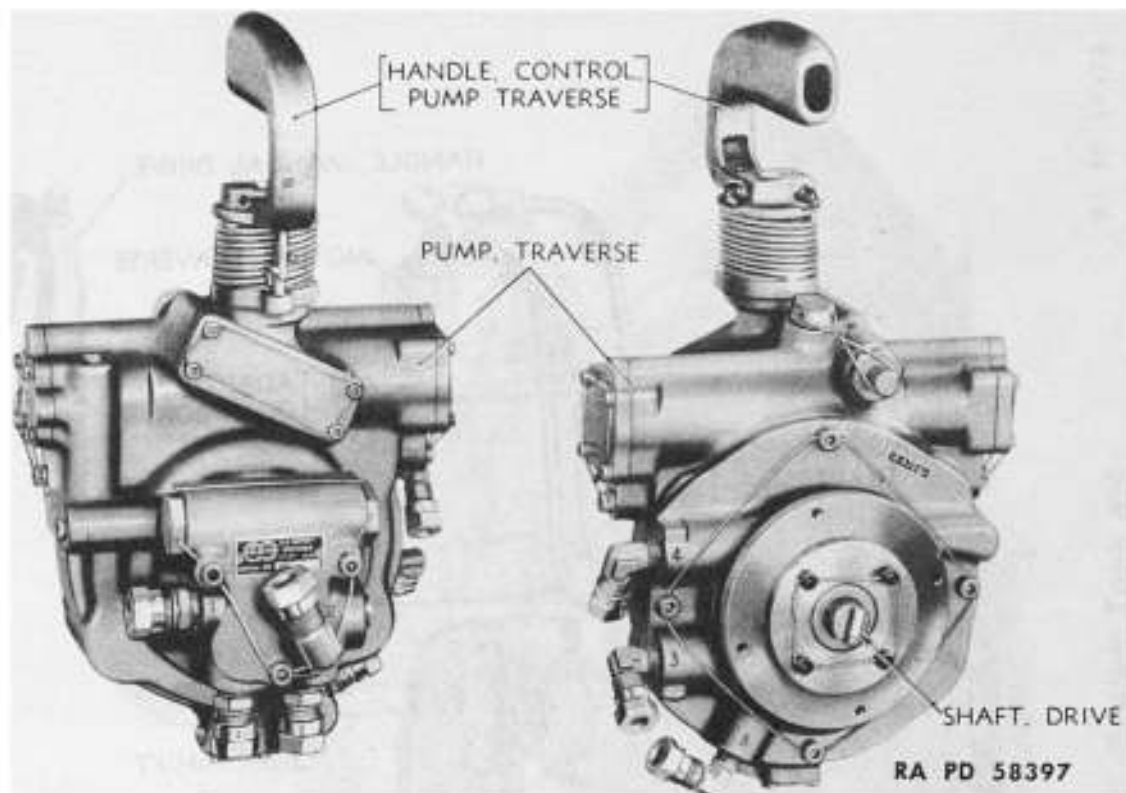


Figure 3 – Front and Rear View of Variable Displacement Traverse Pump

c. In case of power failure, the operator can, through a gear shift lever on gear box, disengage the power drive and engage the manual drive on gear mechanism for manual operation of the turret. Rotating hand crank clockwise traverses the turret clockwise. Rotating hand crank counterclockwise traverses the turret counterclockwise. Releasing the release grip brake lever locks the hand crank drive and turret in a fixed position.

5. DESCRIPTION OF COMPONENTS.

a. **Variable Displacement Traverse Pump** (fig. 3). An Oilgear type TH-411, D-47581 two-way variable displacement pump, directly connected to a vertical electric motor, supplies controlled fluid power for the turret traverse mechanism. A spring centered control handle—mounted integral with pump on the eccentric control shaft—regulates the speed and direction of turret rotation.

b. **Constant Displacement Traverse Motor** (figs. 4 and 5). An Oilgear type S-411, OG-L-44861 constant displacement traverse motor, flanged integral with the gear box adapter and piped to the variable displacement traverse pump, transmits controlled fluid power into a rotary drive for traversing turret in either direction through a gear mechanism, drive pinion, and ring gear. Traverse motor and gear box adapter when assembled together is number D47529.

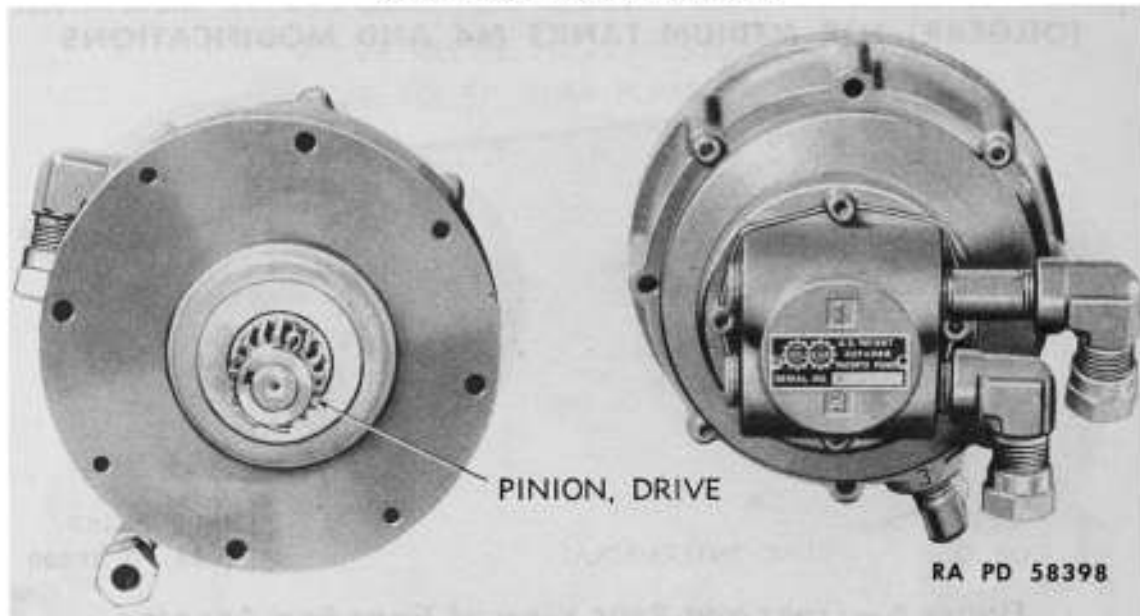
GENERAL DESCRIPTION

Figure 4 – Front and Rear View of Constant Displacement Traverse Motor

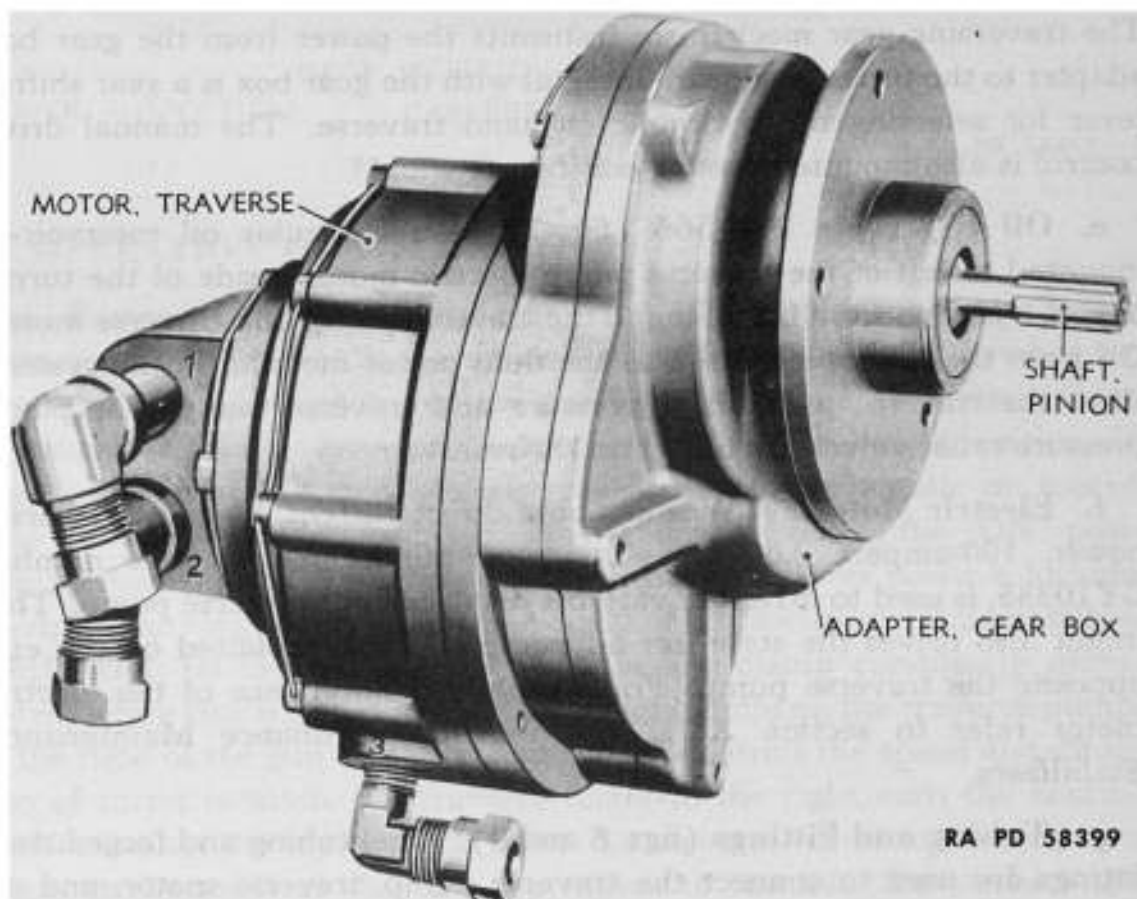


Figure 5 – Three-Quarter View of Traverse Motor and Gear Box Adapter

c. **Gear Box Adapter** (figs. 5 and 6). Interposed between the traversing gear mechanism and the constant displacement traverse motor is a gear box adapter unit OG-L-38923. This intermediate unit reduces the speed from the motor to the gear box train.

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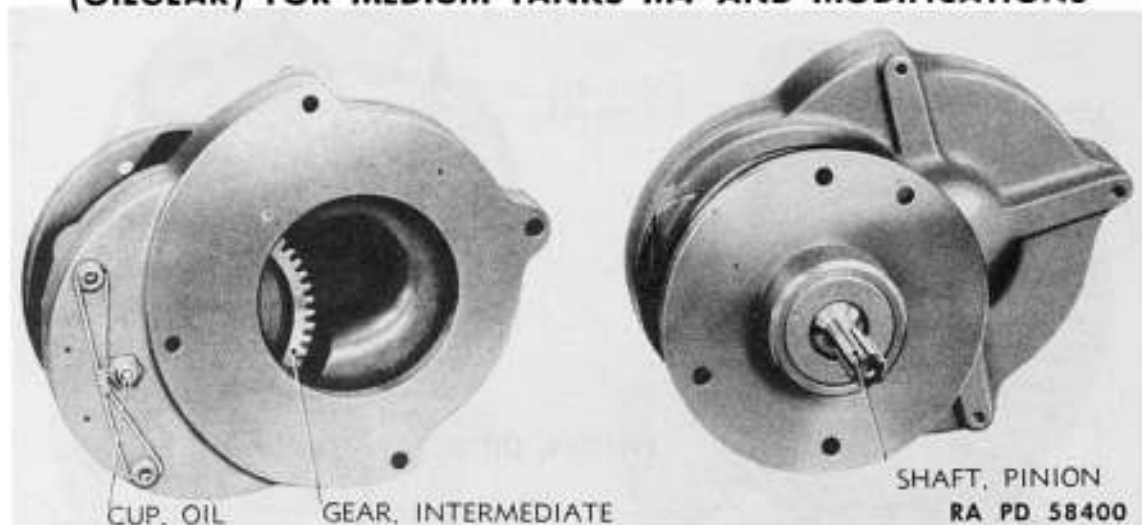


Figure 6 — Front and Rear View of Gear Box Adapter

d. **Traversing Gear Mechanism and Manual Drive D51037** (fig. 2). The traversing gear mechanism transmits the power from the gear box adapter to the turret ring gear. Integral with the gear box is a gear shifter lever for selecting the hydraulic or hand traverse. The manual drive control is also mounted on the gear box.

e. **Oil Reservoir D-47566** (fig. 7). A rectangular oil reservoir—mounted to left of the traverse pump electric motor inside of the turret basket—is connected by tubing to the traverse pump and traverse motor. Oil from the reservoir is used as the fluid power medium in the system. Both the traverse pump high pressure and traverse pump gear pump pressure relief valves are built into the reservoir.

f. **Electric Motor.** A Westinghouse direct current, 24-volt, 2.5 horsepower, 100-ampere 2,000 revolutions-per-minute motor, style number LY10335, is used to drive the variable displacement traverse pump. This motor also drives the stabilizer oil pump which is mounted on the end opposite the traverse pump. For complete maintenance of the electric motor refer to section XIII, TM 9-1798A, Ordnance Maintenance, Stabilizers.

g. **Tubing and Fittings** (figs. 8 and 9). Steel tubing and forged steel fittings are used to connect the traverse pump, traverse motor, and oil reservoir and carry the oil to and from these components. Fittings are furnished as integral parts of each variable displacement traverse pump, constant displacement traverse motor, and oil reservoir.

h. **Oil.** OIL, hydraulic, (Government specification 2-79-A oil, Univis 47, Standard Oil Company) is used as the fluid power medium in the hydraulic turret traversing system. The oil capacity of the system is approximately one gallon.