

TM 9-1727C

RESTRICTED

WAR DEPARTMENT

TECHNICAL MANUAL



**ORDNANCE MAINTENANCE
HYDRA-MATIC TRANSMISSION and
PROPELLER SHAFTS for LIGHT TANKS M5,
M5A1, and 75-MM HOWITZER MOTOR
CARRIAGE M8**

FEBRUARY 5, 1943

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for LIGHT TANKS M5, M5A1,
and 75-MM HOWITZER MOTOR CARRIAGE M8

Prepared under the direction of the
Chief of Ordnance
 (with the cooperation of the Cadillac Motor Car Division,
 General Motors Corporation)

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*This manual supersedes, in part, TB 1732-1, August 29, 1942.

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**ORDNANCE MAINTENANCE — HYDRA-MATIC TRANSMISSION AND PROPELLER SHAFTS FOR
LIGHT TANKS M5, M5A1, AND 75-MM HOWITZER MOTOR CARRIAGE M8**

Section I

INTRODUCTION

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1. PURPOSE AND SCOPE.

a. Technical Manual No. 9-1727C is published for the information and guidance of all ordnance personnel charged with maintenance and overhauling the Light Tanks M5, M5A1, and 75-mm Howitzer Motor Carriage M8.

b. Technical Manual No. 9-1727C covers the Light Tanks M5, M5A1, and 75-mm Howitzer Motor Carriage M8. It includes complete maintenance information on the Hydra-Matic transmissions and propeller shafts. The other technical manuals covering these vehicles are listed in section IV.

2. DESCRIPTION OF VEHICLES.

a. The Light Tank M5 (fig. 1) is an armored, full-tracklaying combat vehicle carrying a crew of 4 men. It is powered by 2 liquid-cooled, 90-degree, V-type, 8-cylinder Cadillac engines located in the engine compartment in the rear of the hull. Power is transmitted to the final drives and tracks through 2 Hydra-Matic transmissions, 2 propeller shafts, a 2-speed, step-down transfer unit, and the controlled differential (fig. 3). This same description applies to the Light Tank M5A1.

b. The Motor Carriage M8 (fig. 2) is an armored, full-tracklaying, self-propelled mount for a 75-mm howitzer. It carries a crew of 4 men. It is powered by the same engines, transmissions, and power train as the Light Tanks M5 and M5A1.

3. REFERENCES.

a. Section IV of this volume lists all technical manuals, standard nomenclature lists, and other publications relative to the materiel described herein.

INTRODUCTION

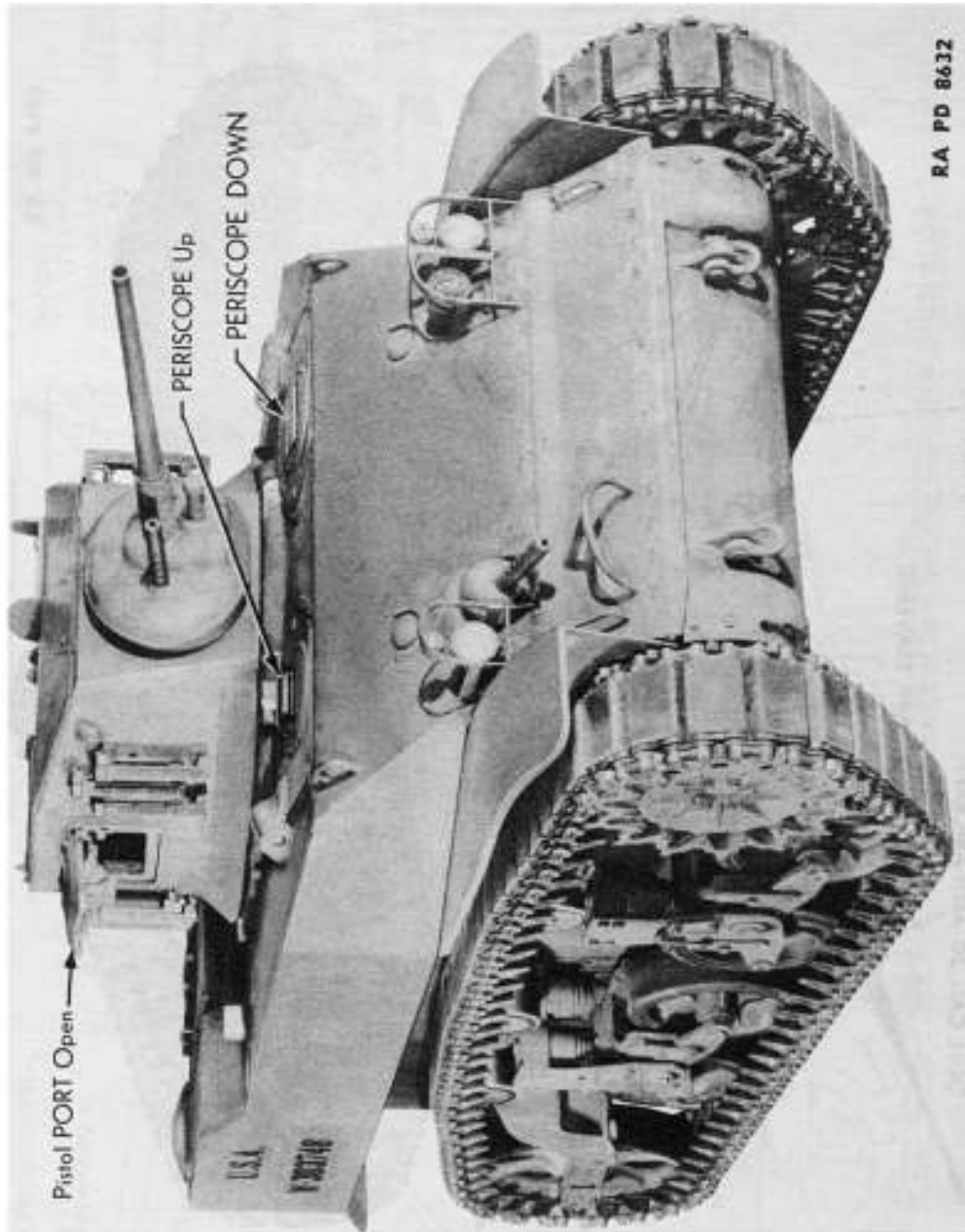


Figure 1 — Light Tank M5 — Right Front View

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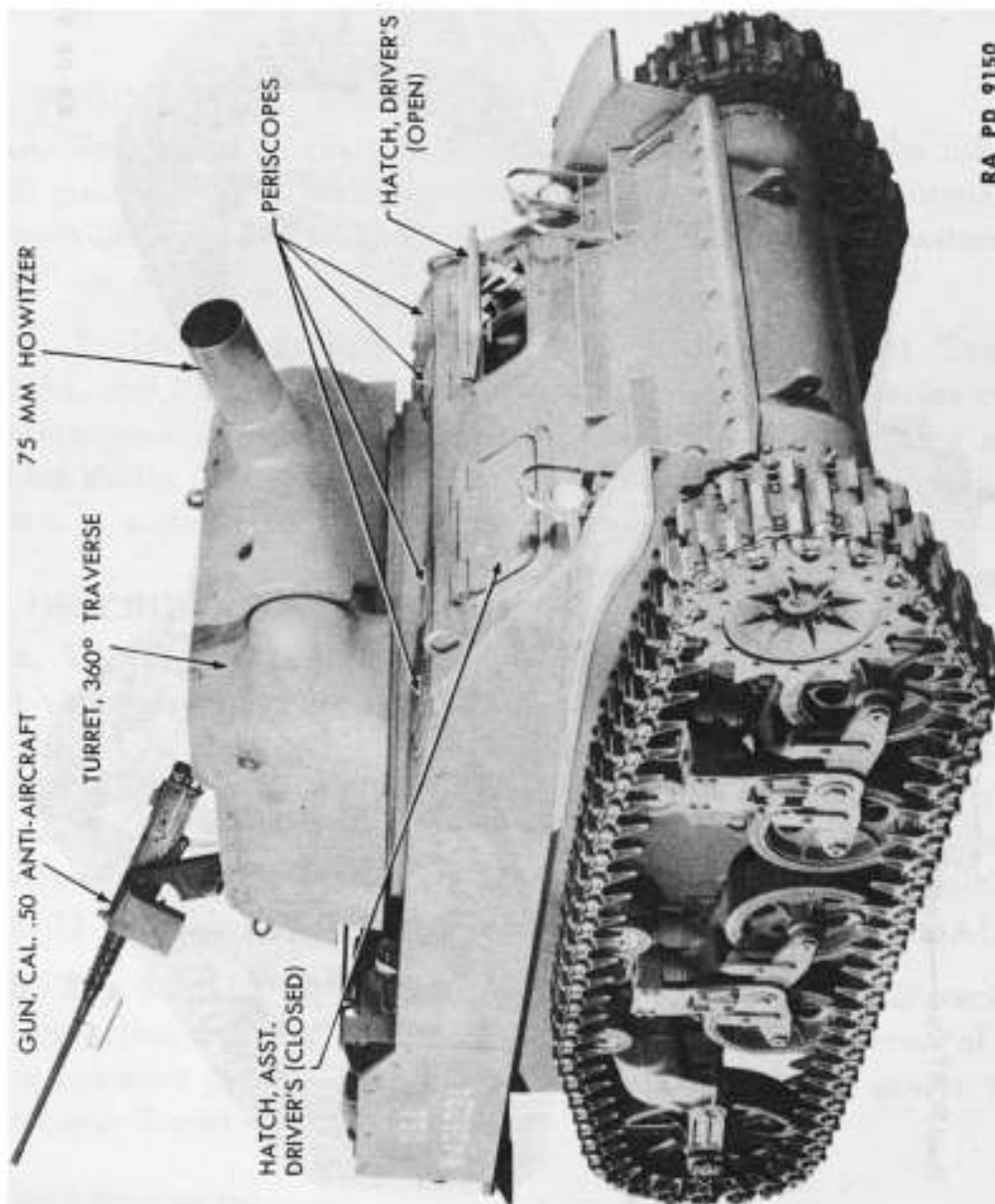
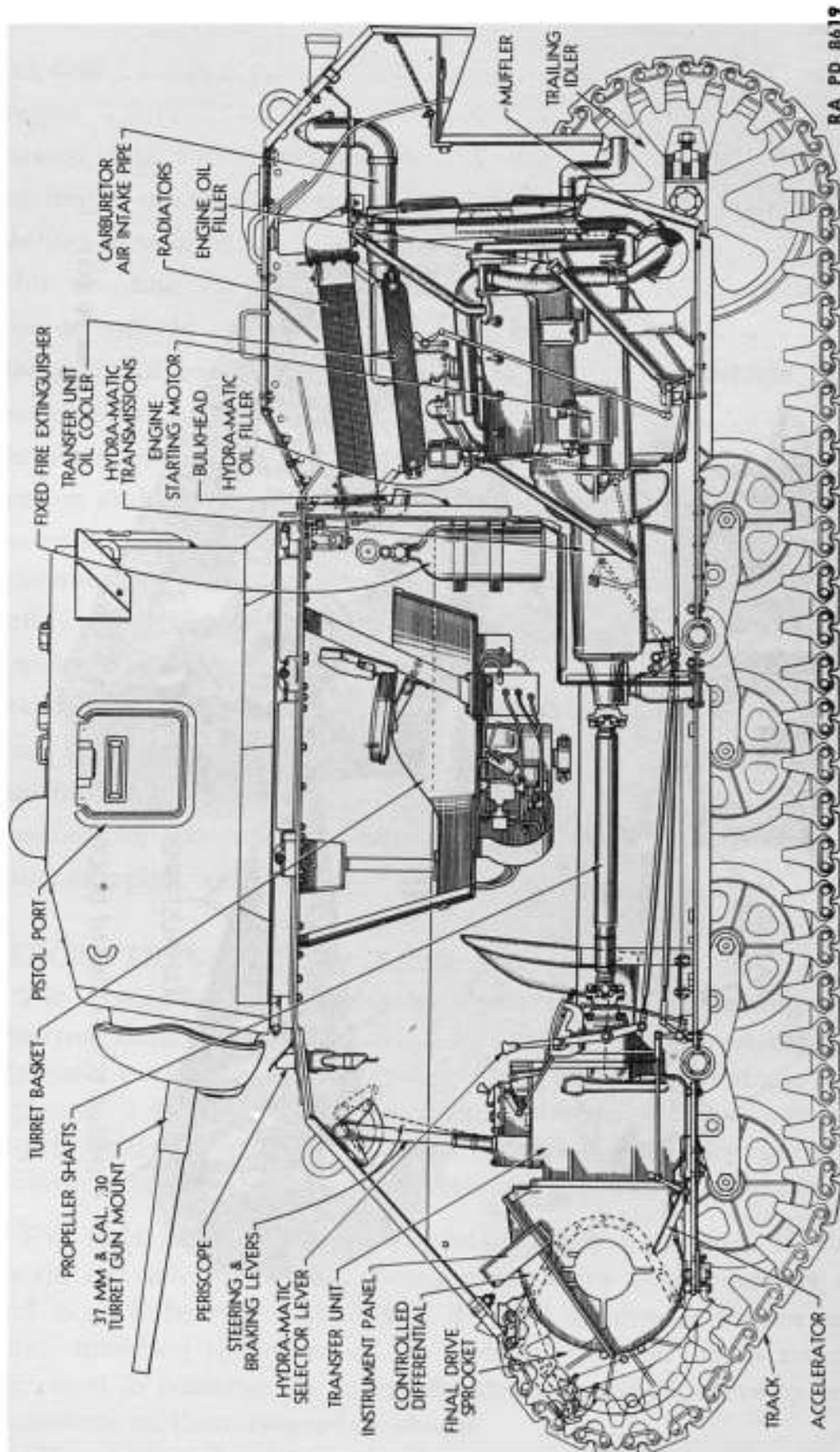


Figure 2 — Motor Carriage M8 — Right Front View

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Figure 3 — Light Tank M5 — Cross Section

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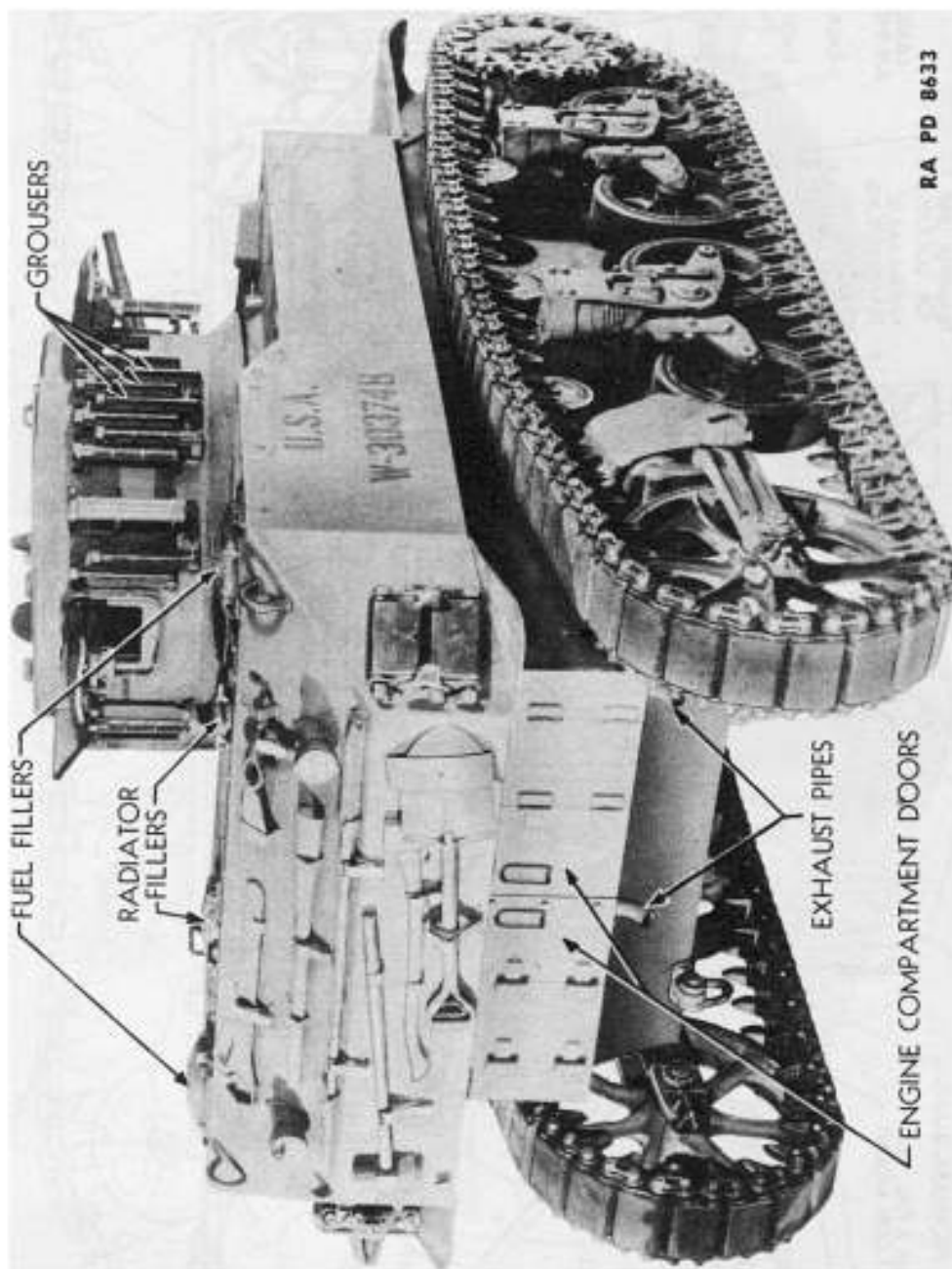


Figure 4 — Light Tank M5 — Right Rear View

Section II

HYDRA-MATIC TRANSMISSION

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4. DESCRIPTION.

a. The Hydra-Matic transmission consists of the following power transmitting units, listed in the order in which they transmit the drive: the flywheel cover; the front planetary unit, consisting of single reduction planetary gears; the fluid coupling or torus members; the rear planetary unit, comprising compound reduction planetary gears; and the reverse unit. The last two units are connected to the output shaft.

b. The fluid coupling of the Hydra-Matic transmission, which replaces the conventional clutch, is composed of two torus members, each splined to an independent shaft (fig. 8). One member is known as the "driving" member; the other as the "driven" member. Both members are identical in construction except for the hubs, which serve to attach the members to their respective shafts.

(1) Rotation of the driving torus member creates centrifugal forces in the fluid contained in this member, and accordingly the fluid tends

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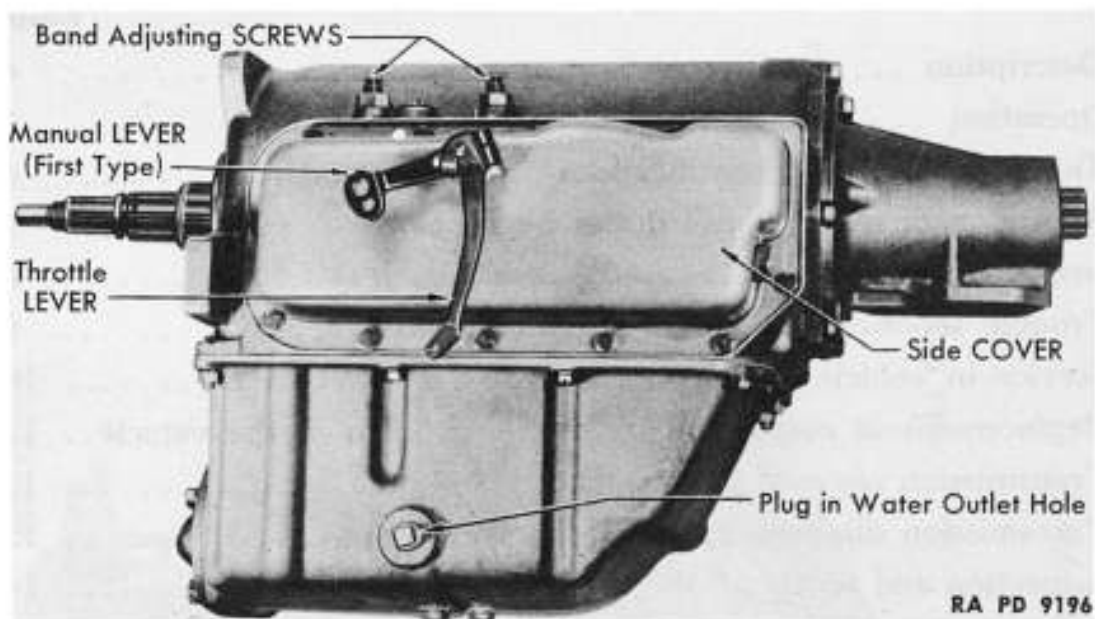


Figure 5 — Hydra-Matic Transmission, Left Side

to flow radially outward, this tendency increasing very rapidly as the rotating speed increases. As the fluid is forced to the outer part of the driving torus, it crosses over to the driven torus member, and sets up a driving force in the driven member which causes it to rotate at nearly the same speed as the driving member (figs. 9 and 10).

c. The planetary units each consist of three planet gears meshed between a sun gear and an internal gear, one of which is integral with a drum which can be held from rotating by a band. The band is released or applied by a "servo" mechanism, which is simply a double-acting piston and cylinder operated by oil and spring pressure. The front and rear planetary units also incorporate a friction drive or multiple disk clutch, which is applied by oil pressure and released by springs. The pressure lines are so arranged that the clutch is released when the band is applied and the clutch is applied when the band is released. In either unit, when the band is applied and the clutch released, either the center gear or the internal gear is held stationary, the planet gears "walk around" the driving gear at reduced speed, and the unit is in reduction (fig. 11). When the band is released and the clutch engaged, however, the entire assembly is locked together and rotates as a unit (fig. 12).

d. In addition to the power transmitting parts, there are the hydraulic control units, including two oil pumps, a governor and various