RESTRICTED

WAR DEPARTMENT

TECHNICAL MANUAL

ORDNANCE MAINTENANCE
ELECTRIC TRAVERSING MECHANISM FOR MEDIUM TANKS M4 AND MODIFICATIONS

JANUARY 15, 1943

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No. 9-1731E

WAR DEPARTMENT
Washington, January 15, 1943

ORDNANCE MAINTENANCE

ELECTRIC TRAVERSING MECHANISM FOR MEDIUM TANKS M4 AND MODIFICATIONS

Prepared under the direction of the
Chief of Ordnance
(with the cooperation of the Westinghouse Electric and Manufacturing Company)

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ORDNANCE MAINTENANCE – ELECTRIC TRAVERSING MECHANISM FOR MEDIUM TANKS M4 AND MODIFICATIONS

Section I

INTRODUCTION

1. SCOPE.

a. This manual is published for the information and guidance of ordnance maintenance personnel. It contains detailed instructions supplementary to those in the field and technical manuals prepared for the using arms for inspection, disassembly, assembly, maintenance, and repair of the electric traverse on M4 series tanks. Additional descriptive matter and illustrations are included to aid in providing a complete working knowledge of the materiel.

2. ARRANGEMENT OF MANUAL.

a. The over-all description of the purpose and operation of the complete traverse is given in section II. Ordnance inspection and trouble shooting procedures are given in section III (in the vehicle) and section IV (in the shop). The best procedure, when possible, is to isolate troubles by components before removing the traverse from the vehicle. Service operations which can be done by the using arms are given in the operator's manual for the specific tank, and are not repeated in this manual. The complete overhaul for each component is given in a separate section (sections V through VIII). Included in the section for each component are: description, operating specifications, echelon breakdown of maintenance, removal from vehicle, inspection and tests before disassembly, disassembly, inspection and repair, assembly, tests before installation, trouble diagnosis chart, and installation in the vehicle. Illustrations and specifications for special tools and equipment are given in section IX, instructions for packing, shipping, and storage in section X, references in section XI.

3. NATURE OF MATERIAL.

a. The information necessary for the operation of the traverse and its maintenance by first and second echelon personnel is contained in

INTRODUCTION

operator's manual for the specific tank. Equipment recommended has been kept as simple and standard as possible. Because of the close tolerances and selective assembly necessary, however, a number of special jigs are required. These are described in section IX. No attempt should be made to service the electric traverse equipment without the necessary tools and a knowledge of the correct limits, specifications, parts, and procedures.

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Section II

DESCRIPTION OF OPERATION

4. PURPOSE.

a. The purpose of the electric traverse (fig. 1) is to rotate the turret in either direction at required speeds up to four revolutions of the turret per minute, and to stop or hold the gun on the target.

5. MODEL SPECIFICATIONS.

a. This manual covers ordnance maintenance on two electric traverse models, style No. 1231700 and style No. 1234375. Their differences are as follows:

(1) STYLE NO. 1231700. On the original style No. 1231700, the handwheel (fig. 48) mounts on a detachable hub (fig. 49), which fits over a long worm shaft (fig. 56). The gear ratio between handwheel and turret ring gear in electrical operation is 72 to 1. There are six contacts in the commander's switch and two leads on the silverstat control. The wiring diagram and chart for this model are shown in figures 13 and 15.

(2) STYLE NO. 1234375. On style No. 1234375, the later model, the handwheel (fig. 48) is mounted on the stud of the hub gear (fig. 49) and a shorter worm shaft (fig. 56) is used. The gear ratio between handwheel and turret drive gear in electrical operation is 100 to 1. This change in ratio is produced by reducing the teeth in the hub gear from 36 to 26. There are four instead of six contacts in the commander's switch, and three in place of two leads on the silverstat control. The wiring has been simplified (figs. 14 and 16).

6. PRINCIPLES OF OPERATION.

a. **Manual** (figs. 2 and 3). In manual operation, the locking arm of the lock lever is seated in the groove next to the handwheel. The handwheel tongue engages the worm shaft groove directly. The worm shaft engages the clutch worm wheel which is connected to the turret drive gear through the clutch housing. Turning the handwheel, therefore,

DESCRIPTION OF OPERATION

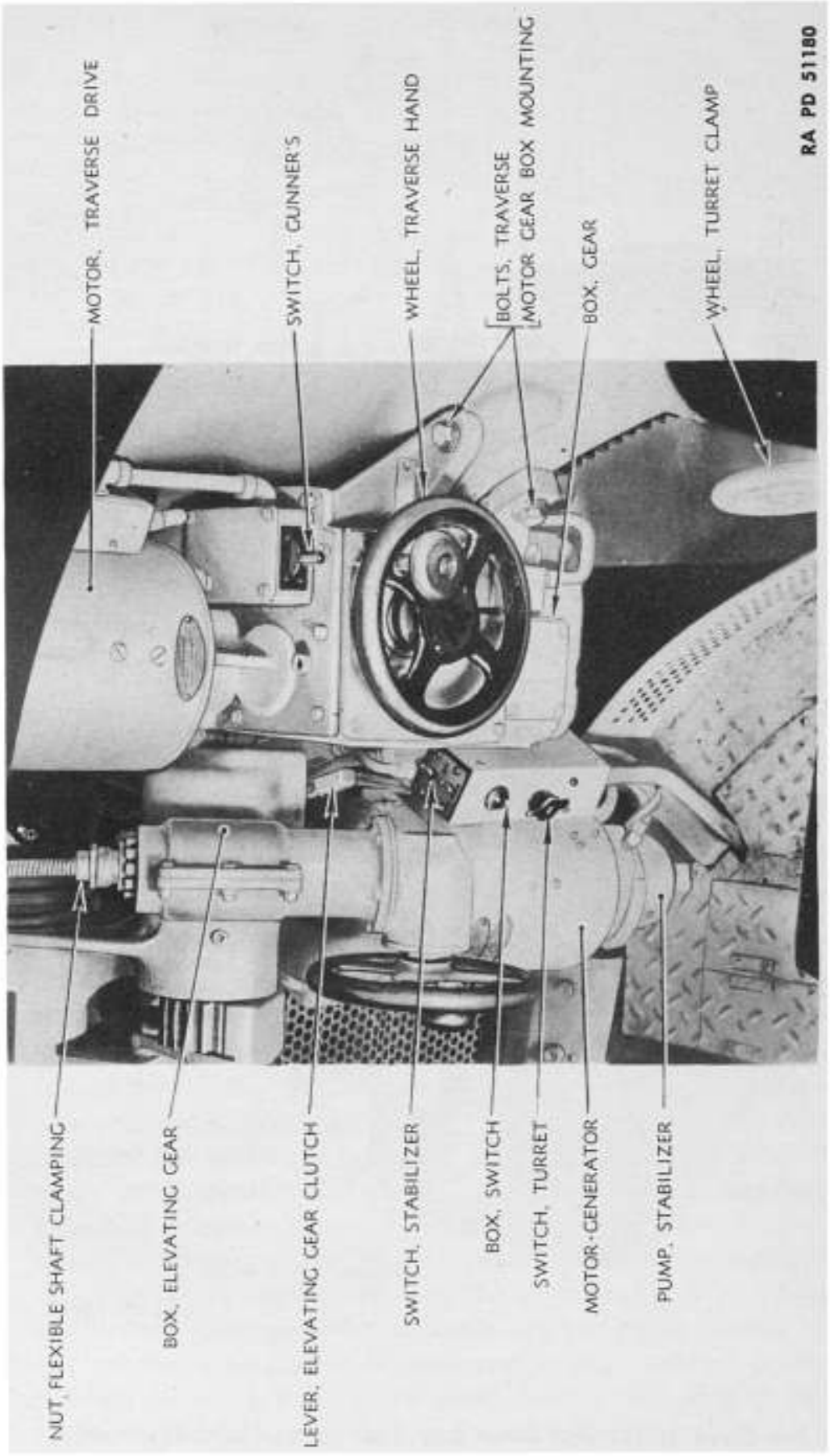

Figure 1 — Electric Traverse Equipment Installed

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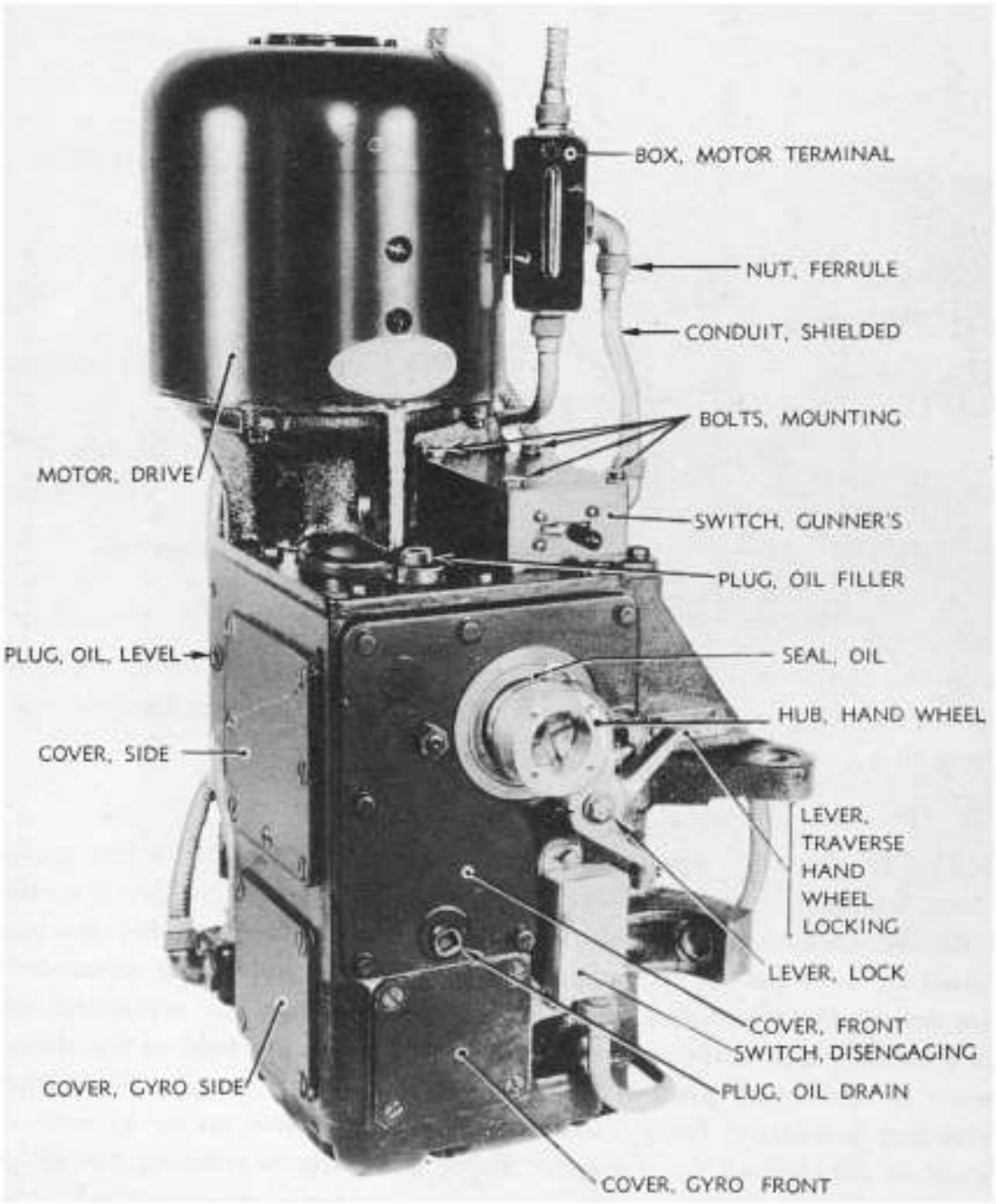

Figure 2 — Drive Motor and Gear Box with Handwheel Removed

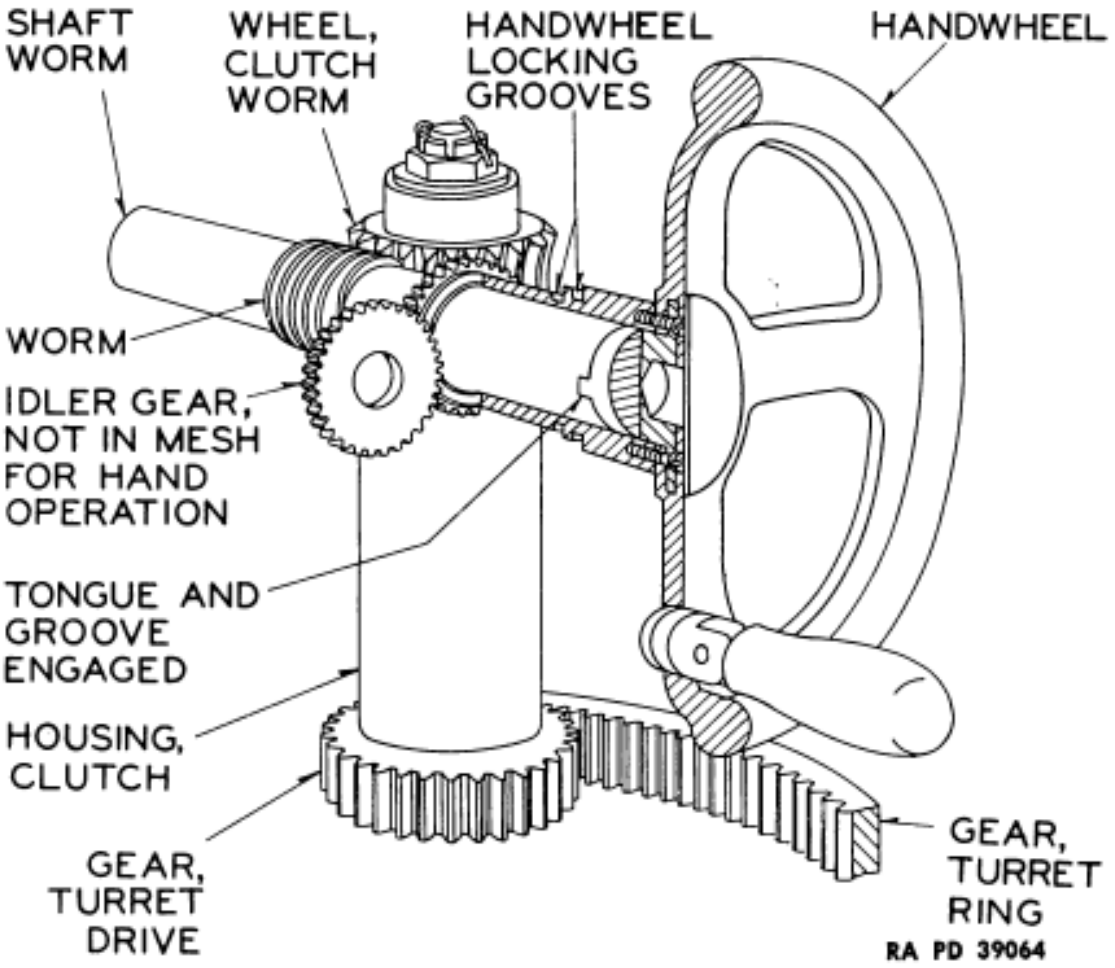

Figure 3 — Gear Train for Manual Operation

turns the worm shaft, clutch housing, turret drive gear (which engages the turret ring gear), and the turret. The ratio between handwheel and turret ring gear is 464 to 1.

b. Power (Electrical) Operation.

(1) In electrical operation, the worm shaft is driven by the drive motor, which receives its power from the motor generator. Use is made of the Ward Leonard system, whereby the speed of a motor is controlled by varying the strength of the field in the supplying generator. The schematic diagram (figs. 4 and 5) shows that the armatures of the generator and drive motor are connected. Also, the field of the drive motor is constantly excited by the 24-volt battery supply. Since the generator armature, being directly connected to the motor generator motor, is running all the time the motor generator is running, the only other condition required to turn the drive motor is an energized generator field. The generator actually has two fields wound opposite to one another, and current is produced in one direction or another, depending on which field is energized. As one side of each field is connected to the battery, grounding the other side energizes it.

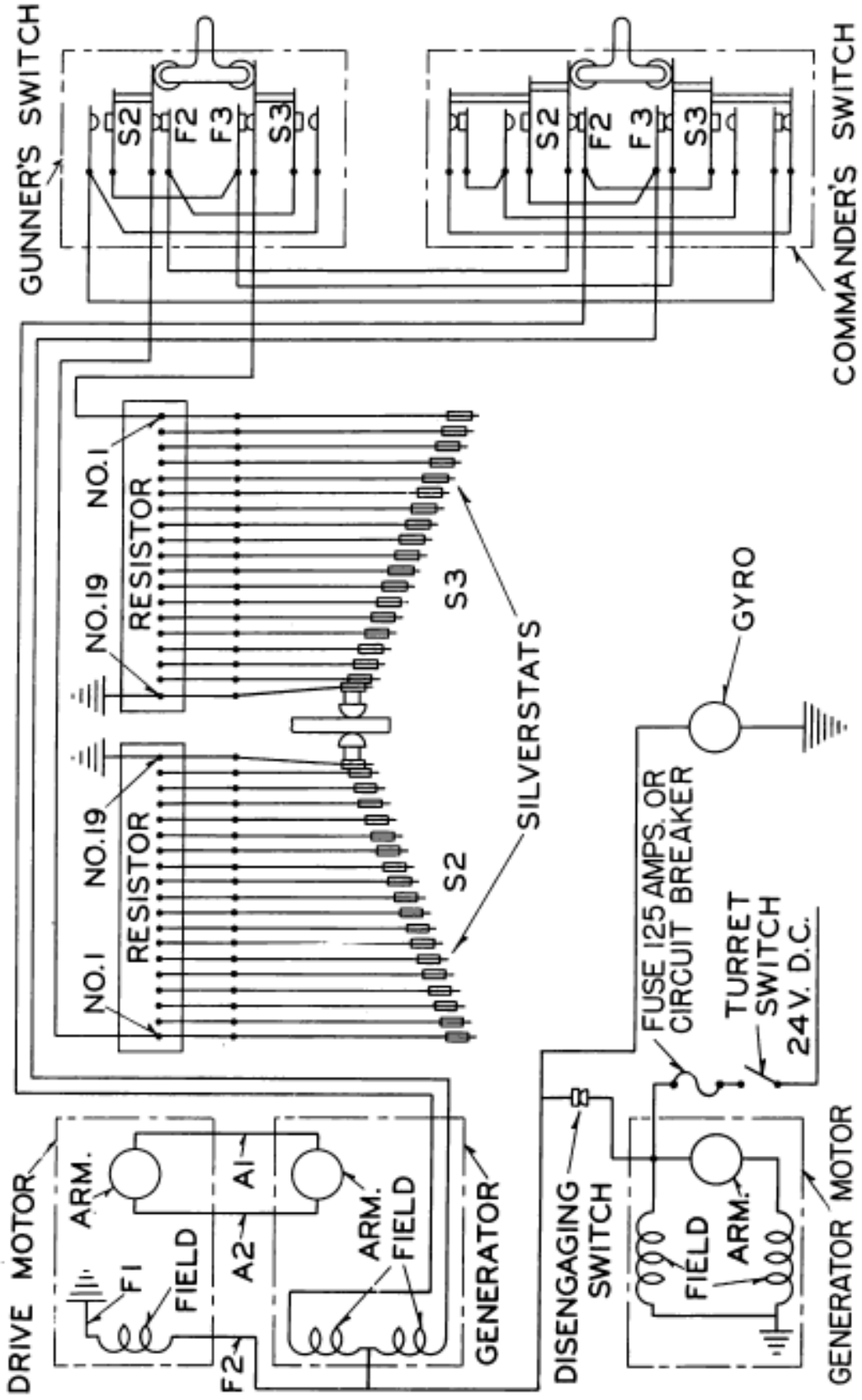

Figure 4 — Schematic Wiring Diagram Traverse Style No. 1231700