

# TM 9-223

WAR DEPARTMENT TECHNICAL MANUAL

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## TWIN CAL. .50 MACHINE GUN MOUNT M33 AND MULTIPLE CAL. .50 MACHINE GUN MOUNT M45

**RESTRICTED DISSEMINATION OF RESTRICTED MATTER—**

The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also paragraph 23b, AR 380-5, 15 March 1944.)

This Technical Manual supersedes TM 9-223, dated 30 October 1942; TM 9-222, dated 8 June 1943; TB 223-1, dated 20 August 1943; and TB 223-2, dated 22 November 1943.

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WAR DEPARTMENT

• 27 JULY 1944

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Washington 25, D. C., 27 July 1944

TM 9-223, Twin Cal. .50 Machine Gun Mount M33 and Multiple Cal. .50 Machine Gun Mount M45, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,*  
*The Adjutant General.*

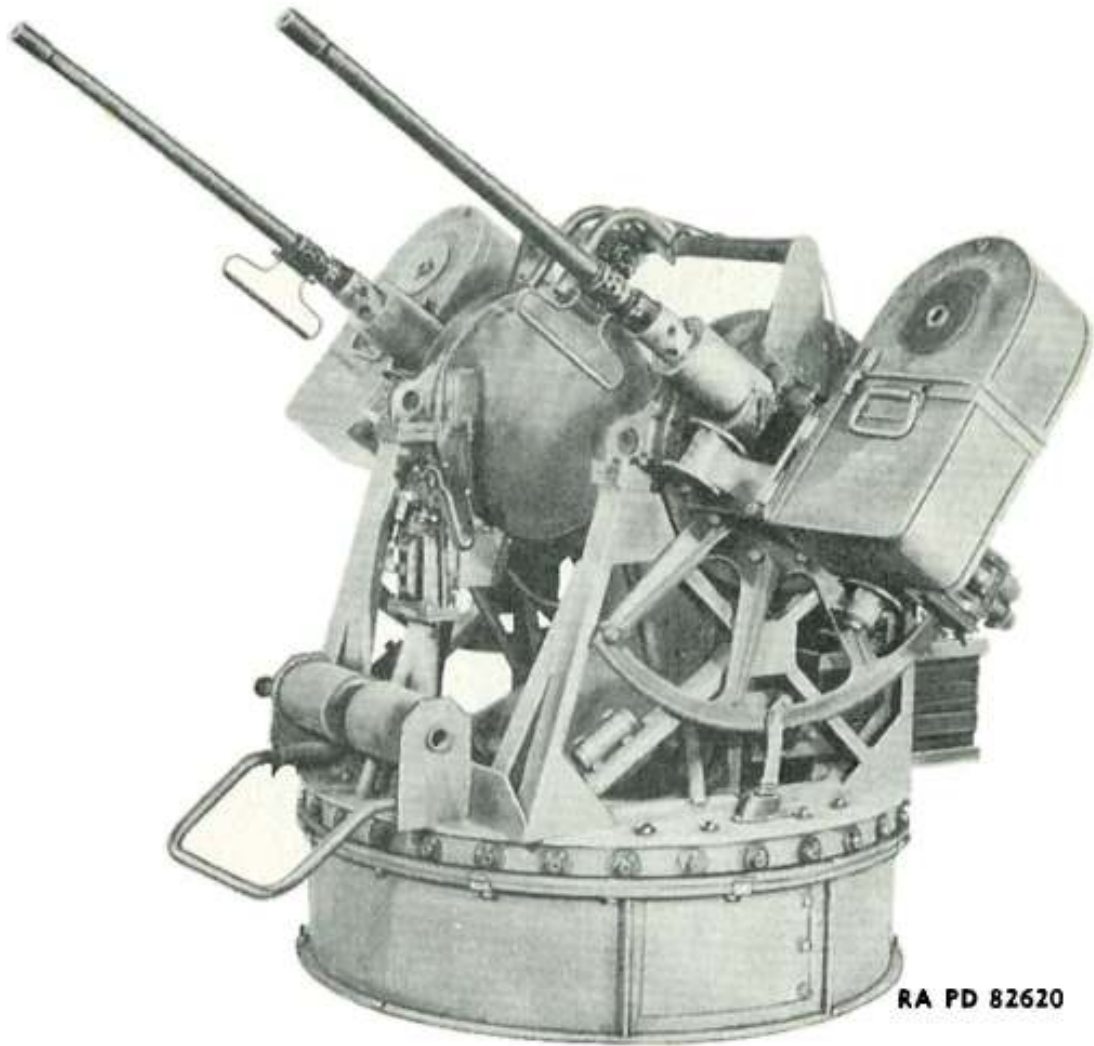
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(For explanation of symbols, see FM 21-6.)

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**Figure 1—Twin Cal. .50 Machine Gun Mount M33 (Without Armor)**

This Technical Manual supersedes TM 9-223, dated 30 October 1942; TM 9-222, dated 8 June 1943; TB 223-1, dated 20 August 1943; and TB 223-2, dated 22 November 1943.

## Section I INTRODUCTION

### 1. SCOPE.

a. This Technical Manual is published for the information and guidance of all concerned. It contains information required by the using arms to identify, use, maintain, and preserve the following materiel:

- (1) Twin cal. .50 Machine Gun Mount M33.
- (2) Multiple cal. .50 Machine Gun Mount M45.

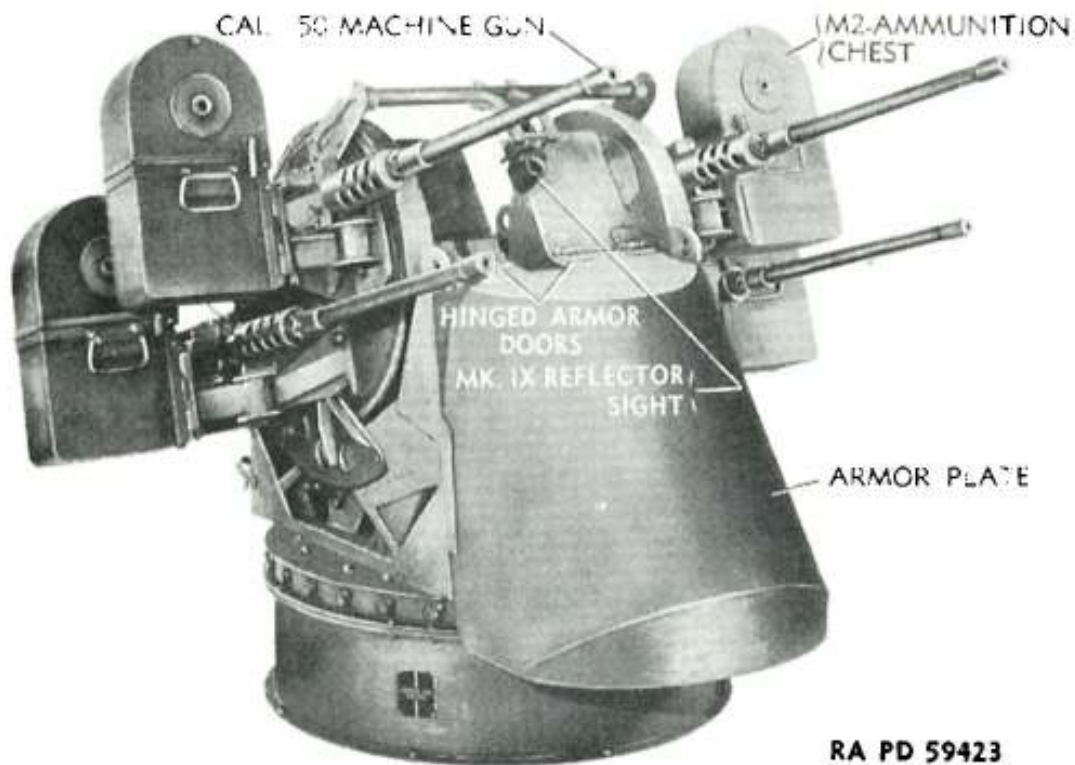
b. This manual differs from TM 9-223 of 30 October 1942 and TM 9-222 of 8 June 1943 in the following respects:

- (1) The material of both manuals has been rearranged and combined into one.
- (2) Illustrations have been added showing power drive unit, sub-assemblies, and associated gun carriages.
- (3) Full explanations have been included of the functioning of all assemblies such as differentials, gears, pulleys, and controls.
- (4) A section on malfunctions and corrections has been added.
- (5) A section on disassembly and assembly has been added.
- (6) The material on care and preservation has been revised and brought up to date and lubrication guides have been added.
- (7) Information has been added on care and maintenance of the power charger, including gasoline engine and generator.

### 2. CHARACTERISTICS.

a. The twin and multiple machine gun mounts (figs. 1 and 2) are power-driven, semi-armored gun mounts with self-contained power units. They can be mounted on a vehicle, trailer, or any suitable fixed base or on the ground. The mounts can be traversed through 360 degrees and elevated through an arc of -10 degrees to +90 degrees from the horizontal. The mount movement and machine gun fire are controlled from a pair of control handles which are placed directly in front of the centrally located seat within the mount.

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RA PD 59423

**Figure 2—Multiple Cal. .50 Machine Gun Mount M45 (With Armor)**

### 3. DIFFERENCES BETWEEN MODELS.

a. The major difference between M33 and M45 Mounts is that the M33 carries *two* cal. .50 machine guns and the M45 carries *four* cal. .50 machine guns. Operation, controls, and component parts are similar on both mounts, with necessary structural and electrical changes made on the M45 Mounts to accommodate two machine guns on each trunnion. Specific differences between the two models are listed below:

(1) **GUNS.** On the M33 Mount, the two guns are mounted through the agency of ring spring adapters. Two studs projecting from the adapter casing are latched in the forward mounting yoke. The four guns for the M45 Mount use heavy barrel supports in place of the ring spring adapters and are mounted by gun securing pins which pass through the forward gun receiver hole.

**NOTE:** M33 Guns with ring spring adapters can be assembled on M45 Mounts. Guns with heavy barrel supports *cannot* be assembled on M33 Mounts.

(2) **ELECTRIC CIRCUITS.**

(a) *M45 Mount.* The two 6-volt storage batteries are connected in series to supply power for the turret drive motor, firing circuit

## INTRODUCTION

relay, and for the four solenoids in the firing circuit. They also supply current for the indicator lamps in the firing circuit and the motor overheat circuit and for the Mk. IX Reflector Sight. The turret drive switch is located on the mount frame below the gunner's right hand. A sight interlock switch mounted on the side of the turret drive switch box permits illumination of the Mk. IX Sight for bore sighting adjustments without operating the power drive. The firing circuit switch may be operated independently, so that the guns may be fired without the turret drive operating.

(b) *M33 Mount.* The two storage batteries supply power for the turret drive motor, the two firing solenoids, and for the light bulbs in the firing circuit indicator lamp and the Mk. IX Reflector Sight. The batteries are connected in series with the negative side grounded to the mount frame. Power is taken off the positive terminal. The power charger is connected across the batteries, and maintains the charge. All circuits stem from a large junction box mounted on the frame in back of the gunner's seat. The M33 Mount does not have motor thermostat, overheat lamp, firing circuit relay, sight interlock switch, or circuit breaker reset button as provided on M45 Mounts. The turret drive switch must be closed in order to energize the firing circuit. The Mk. IX Reflector Sight may be illuminated independently of the turret drive circuit.

### b. Differences Between Early and Late M45 Mounts.

(1) The following additions or modifications have been made on the late model M45 Mounts:

- (a) The voltmeter has been removed and a hydrometer installed.
- (b) The combination turret drive switch and circuit breaker has been replaced with a turret drive switch and separate circuit breaker equipped with reset button.
- (c) Batteries of the same capacity, but with larger physical dimensions have been installed.
- (d) Foot platforms for the right and left cannoneers have been installed at the rear of the mount.
- (e) Safety belts for the gunner have been added.

### c. Capacitors.

(1) The capacitors for the reduction of interference on radio sets have been installed on a great number of Multiple cal. .50 Machine Gun Mounts M45 and M33, and at the present time, the rest of the mounts are being modified by a traveling field crew. However, due to the limited supply of the capacitors, they are not being installed in any of the Briggs-Stratton power charger units which are stored as spare parts.



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(2) One of the capacitors is located in the generator control box. On replacing Briggs-Stratton power charger unit with one from spare parts, the capacitor should be removed from the old generator control box and installed in the generator control box of the new unit.

**4. DATA.**

**a. General.**

Weight of M33 Mount fully equipped (approx)	1500 lb
Weight of M45 Mount fully equipped (approx)	2400 lb
Over-all width of M33 Mount	72 in.
Over-all width of M45 Mount	81½ in.
Over-all height of M33 Mount (guns level)	72 in.
Over-all height of M33 Mount (guns fully elevated)	78½ in.
Over-all height of M45 Mount (guns level)	55 in.
Over-all height of M45 Mount (guns fully elevated)	75 in.

**b. Power Drive.**

Power—Maxson variable speed drive, Model 120A with electric motor—style 441Q417, Emerson Corporation, or Air Associates 1-hp, compound wound, 12-volt, 90-amp or equivalent.

Output torque—13 in-lb at 2,800 rpm approximately at either shaft, zero output at the other.

Dimension—11 in. high x 18½ in. wide x 25½ in. long.

Weight 139 lb

**c. Power Charger.**

Briggs and Stratton, Model 300, PC-1 for M33 Mount.

Briggs and Stratton, Model 304, type 25592 for M45 Mount.

Output 300 watts

Output 12 volts

Gasoline Engine (4-cycle) 1 cylinder

Weight (with fuel and oil) 75 lb

**d. Armament.**

Gun, machine, cal. .50, Browning, M2, heavy barrel, turret type.

2 mounted outside the right and left trunnions of M33 Mount

4 mounted outside the right and left trunnions of M45 Mount

**e. Ammunition.**

200 cal. .50 rounds carried in each ammunition chest.

**INTRODUCTION****f. Fuel and Oil.**

Power charger:

Fuel capacity ..... 2 qt

Oil capacity ..... 1½ pt

Variable speed drive:

Oil capacity (per differential) 22 cu cm (½ pt)

**g. Performance.**

Duty cycle (5 min off, 5 min on) ..... 5 hr

Tests have indicated that when using a cycle of 5 minutes off and 5 minutes on, turret operation can reasonably be expected for 5 hours, starting with fully charged batteries and running power charger continuously.

Azimuth speed ..... 0 deg to 60 deg per sec

Elevation speed ..... 0 deg to 60 deg per sec

Power charger speed ..... 2,600 to 2,900 rpm

Batteries—2—storage, lead acid, (4H), 3-cell, 23 plates per cell.

Minimum capacity at 20-hour rate—150 ampere-hours.

NOTE: Batteries of larger outside dimensions are installed on late M45 Mounts; specifications remain the same as listed above.

**h. Areas of Interrupted Fire of M33 Mounts.**

M33 Mount elevation interrupter switches:

Left and right guns ..... from lowest limit of depression to 10-deg ± 1-deg elevation

M33 Mount azimuth interrupter switches:

Left gun ..... from 21½-deg ± 1-deg traverse left to 52-deg ± 1-deg traverse right

Right gun ..... from 25½-deg ± 1-deg traverse right to 52-deg ± 1-deg traverse left

**i. Areas of Interrupted Fire of M45 Mounts.**

M45 Mount elevation interrupter switches:

Lower guns ..... from lowest limit of depression to 4-deg ± 1-deg elevation

Upper guns ..... from lowest limit of depression to -1½-deg ± 1-deg depression

M45 Mount azimuth interrupter switches:

Lower right gun ..... from 56½-deg ± 1-deg azimuth left to 29½-deg ± 1-deg azimuth right

Upper right gun ..... from 53-deg ± 1-deg azimuth left to 33-deg ± 1-deg azimuth right

Upper left gun ..... from 26-deg ± 1-deg azimuth left to 60-deg ± 1-deg azimuth right

Lower left gun ..... from 22½-deg ± 1-deg azimuth left to 63½-deg ± 1-deg azimuth right