TM 9-1768A

WAR DEPARTMENT TECHNICAL MANUAL

ORDNANCE MAINTENANCE

TRACTOR TRUCK M20, COMPONENT OF 45-TON TANK TRANSPORTER TRUCK-TRAILER M19, ENGINE, CLUTCH, FUEL SYSTEM, AND COOLING SYSTEM

RESTRICTED. DISSEMINATION OF RESTRICTED MATTER. No person is entitled solely by virtue of his grade or position to knowledge or possession of classified matter. Such matter is entrusted only to those individuals whose official duties require such knowledge or possession. (See also paragraph 23b, AR 380–5, 15 March 1944.)

WAR DEPARTMENT • *22 JUNE 1945*

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This TM supersedes portions of OFSTB 1700-32, dated 8 Jul 43, and WDTB ORD 74, dated 8 Jul 43, which apply to the materiel covered in this TM; however, these TB's remain in force until incorporated in all other affected TM's or specifically rescinded. This TM, together with TM 9-768, dated 25 Oct 44, and TM 9-1768B supersedes TM 10-1225, dated 25 Oct 41, and TM 10-1255, dated 6 Jul 42; however, these TM's remain in effect until TM 9-1768B is published.

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WAR DEPARTMENT
Washington 25, D. C., 22 June 1945

TM 9-1768A, Ordnance Maintenance: Tractor Truck M20, Component of 45-ton Tank Transporter Truck-Trailer M19, Engine, Clutch, Fuel System, and Cooling System, 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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(Refer to FM 21-6 for explanation of distribution formula.)

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CHAPTER 1

INTRODUCTION

1. SCOPE.

a. These instructions are published for the information and guidance of personnel responsible for third and higher echelons of maintenance on the Hercules-Diesel Model DFXE engine, clutch, fuel system, and cooling system for the Tractor Truck M20 (component of the 45-ton Tank Transporter Truck-Trailer M19). They contain information on maintenance which is beyond the scope of tools, equipment, or supplies normally available to using organizations. 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 and procedure for trouble shooting, disassembly, inspection, repair, and assembly of the engine, clutch, fuel system, and cooling system for the Tractor Truck M20.

c. TM 9-768 contains operating and record echelon maintenance instructions on the 45-ton Tank Transporter Truck-Trailer M19.

d. TM 9-1768B contains a description and procedure for trouble shooting, disassembly, inspection, repair, and assembly of the power train, chassis, and auxiliary equipment for the Tractor Truck M20.

e. TM 9-1768C contains a description and procedure for trouble shooting, disassembly, inspection, repair, and assembly of the Trailer M9 (component of 45-ton Tank Transporter Truck-Trailer M19).

f. TM 9-1825A contains a description and procedure for disassembly, inspection, repair and assembly of the electrical equipment on the Tractor Truck M20.

g. TM 9-1827A contains a description and procedure for disassembly, inspection, repair, and assembly of the air brake systems for the Tractor Truck M20 and Trailer M9.

2. RECORDS.

a. Forms and records applicable for use in performing prescribed operations are listed below with a brief explanation of each:

(1) WAR DEPARTMENT LUBRICATION ORDER. War Department Lubrication Order No. 160 prescribes lubrication maintenance for this vehicle. A lubrication order is issued with each vehicle and is to be carried with it at all times. Instructions on the order are binding on all echelons of maintenance and there shall be no deviations.

(2) W.D., A.G.O. FORM NO. 461, PREVENTIVE MAINTENANCE SERVICE AND TECHNICAL INSPECTION WORK SHEET FOR WHEELED AND HALF-TRACK VEHICLES. This form will be used for all monthly and semiannual maintenance services and all technical inspections performed on wheeled or half-track vehicles.

(3) W.D., A.G.O. FORM 468, UNSATISFACTORY EQUIPMENT REPORT. This form will be used for reporting manufacturing, design, or operational defects in materiel with a view to improving and correcting such defects, and for use in recommending modifications on materiel. This form will not be used for reporting failures, isolated materiel defects, or malfunctions of materiel resulting from fair wear and tear or accidental damage; nor for the replacement, repair, or the issue of parts and equipment. It does not replace currently authorized operational or performance records.

(4) W.D., A.G.O. FORM NO. 478, MWO AND MAJOR UNIT ASSEMBLY REPLACEMENT RECORD. This form, carried with the vehicle, will be used by all personnel completing a modification or major unit assembly (engine, transmission, transfer case, etc.) replacement to record clearly the description of work completed, date, vehicle hours and/or mileage, and MWO number or nomenclature of unit assembly. Personnel performing the operation will initial in the column provided. Minor repairs, and accessory replacements will not be recorded.

(5) W.D., A.G.O. FORM NO. 10-144 (TALLY SHEET, INCOMING). This form may be used to record all incoming materials or supplies pending negotiation of a final voucher. It may also be used in exchanging vehicles, parts, or tools, or in lieu of shipping ticket.

(6) W.D., A.G.O. FORM NO. 10-145 (TALLY SHEET, OUTGOING). This form may be used to record all outgoing materials or supplies pending negotiation of the final voucher. It may also be used in exchanging vehicles, parts, or tools, or in lieu of shipping ticket.

(7) W.D., A.G.O. FORM NO. 9-71 (LOCATOR AND INVENTORY CONTROL CARD). This form may be used as a bin tag, locator card, or inventory control card in maintaining spare parts stocks. This form is for tactical units only.

(8) W.D., A.G.O. FORM NO. 9-76 (REQUEST FOR JOB ORDER). This form may be used by any officer or authorized person requiring production, repair, alteration, inspection, or any other type of work from another organization, department, or echelon. Not required for second or third echelon repairs.

(9) W.D., A.G.O. FORM NO. 9-77 (JOB ORDER REGISTER). This form will be prepared, when job orders are used, in single copy only, by service echelons to furnish a chronological order and record of job order numbers and related information.

(10) W.D., A.G.O. FORM NO. 9-78 (JOB ORDER). This form, properly executed, may be used as an authority for work. No work of any nature will be performed in a service echelon shop keeping a cost accounting-type record system without a properly authenticated job order.

(11) W.D., A.G.O. FORM NO. 9-79 (PARTS REQUISITION). This form will be used as an interdepartmental shop requisition to request parts where job orders are required.

(12) W.D., A.G.O. FORM NO. 9-80 (JOB ORDER FILE). This folder may be used to hold under one cover all shop papers and records incident to a particular job order or to a particular vehicle.

(13) W.D., A.G.O. FORM NO. 9-81 (EXCHANGE PART OR UNIT IDENTIFICATION TAG). This tag, properly executed, may be used when exchanging unserviceable items for like serviceable assemblies, subassemblies, parts, vehicles, and tools.

CHAPTER 2
DESCRIPTION

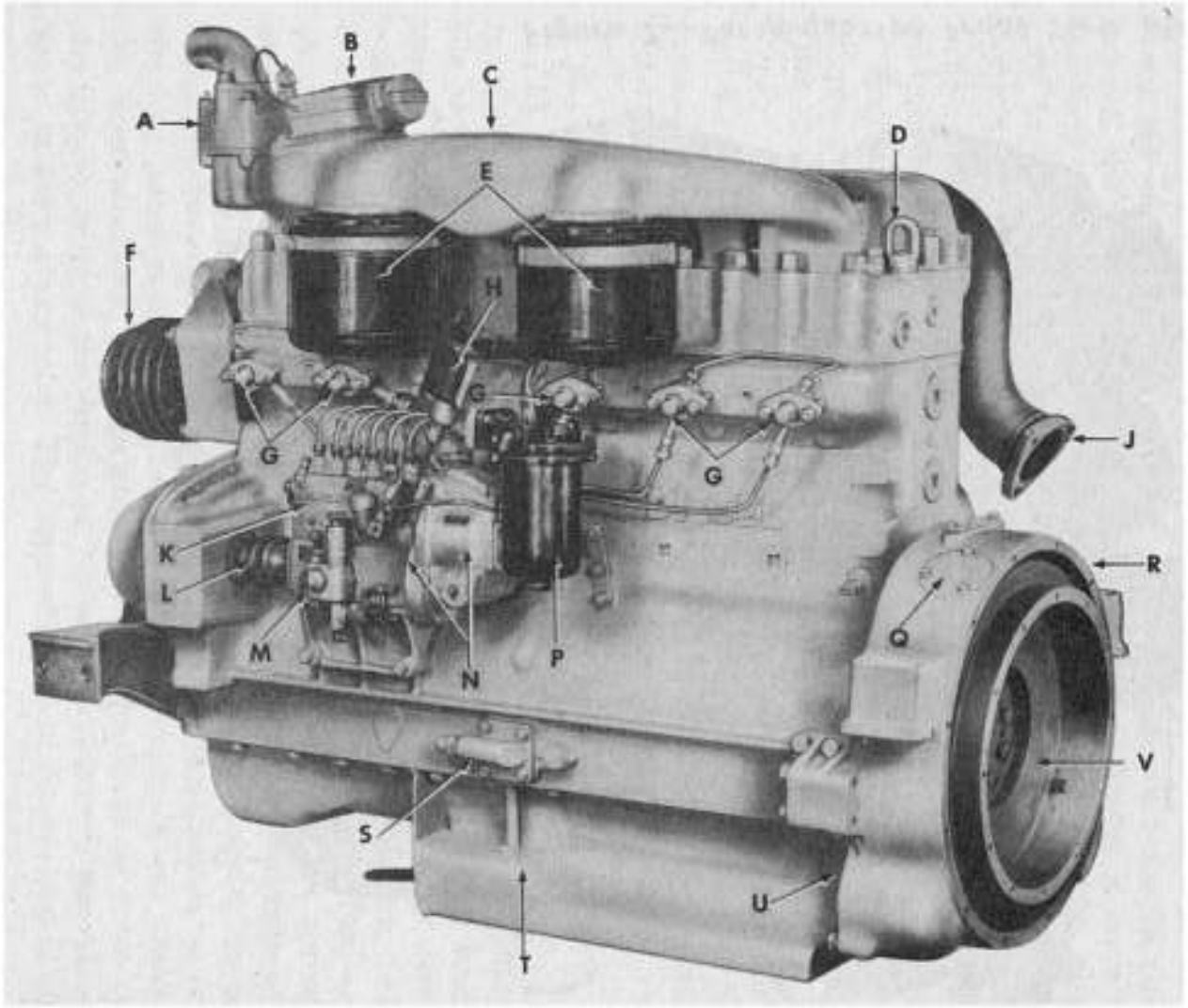
3. ENGINE.

a. Description (figs. 1 and 2). The Hercules-Diesel Model DFXE engine is of the 6-cylinder compression ignition type, with a piston displacement of 839 cubic inches. It develops a maximum torque of 685 foot-pounds at 1,150 revolutions per minute and 660 foot-pounds torque at 1,600 revolutions per minute. The developed brake horsepower at governed speed of 1,600 revolutions per minute is 201. Normal operating temperature is 160° to 180° F. The cylinder block and crankcase are cast integral. Valve mechanism is of the overhead type with the valves located in the two cylinder heads. The crankshaft is supported on seven main bearings. Cylinder bores contain replaceable liners.

4. FUEL SYSTEM (fig. 106).

a. General. The fuel injector assembly, which consists of fuel injector pump, variable speed governor, and fuel transfer pump, is mounted as a unit on the left side of the engine and driven by sprockets and chain from the camshaft. Each of the six elements of the injector pump are connected to one of the six nozzles which inject metered fuel into the cylinder combustion chambers. There are two fuel tanks, one on each side the vehicle, on the frame rail just below the cab. Both tanks are connected to the intake line of the fuel transfer pump, but gate valves are provided so that fuel is drawn from only one tank at a time.

b. Operation. Fuel drawn from the tank by the fuel transfer pump passes through a fuel strainer mounted to the rear of the injector assembly. The filtered fuel then passes through a line and into the gallery of the injector pump where the helical valves of the injector pump meter the fuel, in accordance with timing and calibration setting, to the fuel nozzles under a pressure above 2,000 pounds to the square inch. The spring-loaded nozzles close as soon as fuel pressure drops below 2,000 pounds per square inch; at each stroke a small amount of the fuel passes back through the leak-off manifold through the overflow valve and into the fuel tank through an overflow line. A stop control solenoid connected by lever to the fuel control rack operates to shut off the fuel supply to the injector pump, and stop the engine when the stop push button on the dash is pressed by the operator. A fuel suction line extends from the bottom of the fuel transfer pump (fig. 115) to the starter burner, which is mounted on the forward section of the air intake manifold. The starter burner creates a flame in the air intake manifold, from fuel ignited by a spark, to aid in cold weather starting.



A—THERMOSTAT
B—STARTER BURNER
C—INTAKE MANIFOLD
D—LIFTING EYE
E—AIR CLEANERS
F—FAN PULLEY
G—FUEL NOZZLES
H—STOP CONTROL SOLENOID
J—EXHAUST MANIFOLD FLANGE
K—FUEL INJECTOR PUMP
L—ADJUSTABLE COUPLING
M—FUEL TRANSFER PUMP
N—GOVERNOR
P—FUEL FILTER
Q—FLYWHEEL TIMING HOLE COVER
R—BELL HOUSING
S—OIL PRESSURE REGULATOR
T—OIL PAN
U—GEAR OPENING FOR EXTRA STARTER
V—FLYWHEEL

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Figure 1—Three-quarter Rear View of Engine