

TM-10-1605

MAINTENANCE MANUAL

4 TON 6x6

DIAMOND T MOTOR CAR CO.

**BUILT FOR
UNITED STATES ARMY**



MODEL NUMBERS

968

969

970

CONTRACT NUMBERS

W-398-QM-8926

W-398-QM-9568

U. S. A. REGISTRATION NUMBERS

W-457477 TO W-459000

W-003115 TO W-003621

TM-10-1605

FORM 968-1

TM 10-1605

**WAR DEPARTMENT,
Washington, June 28, 1941**

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Manual, Truck, 4-ton, 6 x 6, Diamond "T" (Models
968, 969, 970) published by Diamond "T" Motor
Car Company, is furnished 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:

**E. S. ADAMS,
Major General,
The Adjutant General.**

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4 TON 6x6

DIAMOND T MOTOR CAR CO.

SERIALS

9680001 TO 9681380

9690001 TO 9690507

9700001 TO 9700144

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W-398-QM-9568

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Section One: CARE AND OPERATION

Section Two: SHOP MAINTENANCE

DIAMOND T MOTOR CAR COMPANY

FACTORIES: CHICAGO, ILLINOIS, U. S. A.

CONTENTS

SECTION ONE: Care and Operation

Instruction Plates and Serial Numbers.....	0-3
General Driving Instructions	0-5
Lubrication	0-10
Fuel System	0-15
Electrical System	0-21
Engine	0-31
Cooling System	0-33
Wheels	0-36
Wrecker Equipment	0-38
Wrecker Lubrication	0-45
Troubles— Causes and Corrections	0-47
Periodic Inspection Chart	0-54

SECTION TWO: Shop Manual

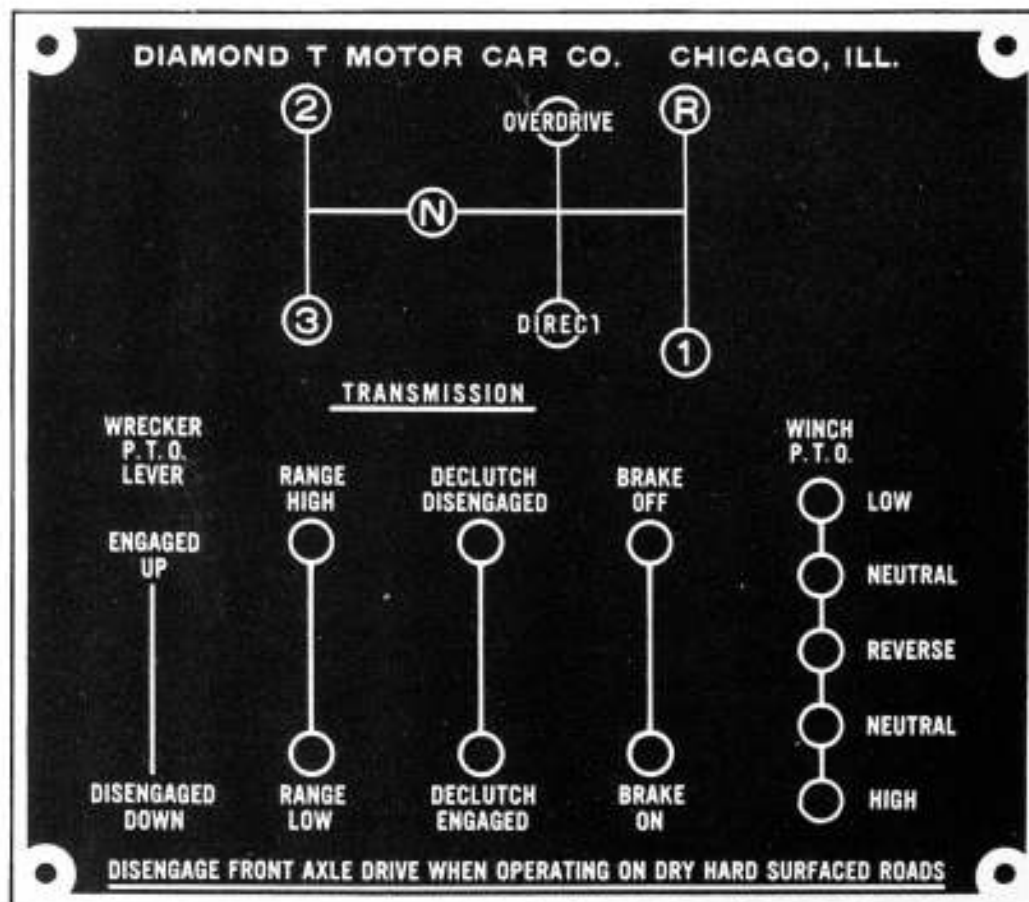
Front Axle	1-1
Rear Axle	2-1
Springs	3-1
Engine	4-1
Clutch	5-1
Transmissions:	
Main Transmission	6-1
Transfer Case	6-7
Power Take Off	6-11
Wrecker Transmission	15-8
Propeller Shafts	7-1
Cooling System	8-1
Fuel System	9-1
Electrical System	10-1
Steering Gear	11-1
Brakes— Hand	12-1
Air Equipment	13-1
Frame	14-1
Cab and Body	15-1
Cargo Body (Model 968)	15-3
Ponton Body (Model 970)	15-4
Wrecker Body (Model 969)	15-5
Winch	16-1
Miscellaneous Specifications	17-1

SECTION ONE

CARE and OPERATION

INSTRUCTION PLATES AND SERIAL NUMBERS

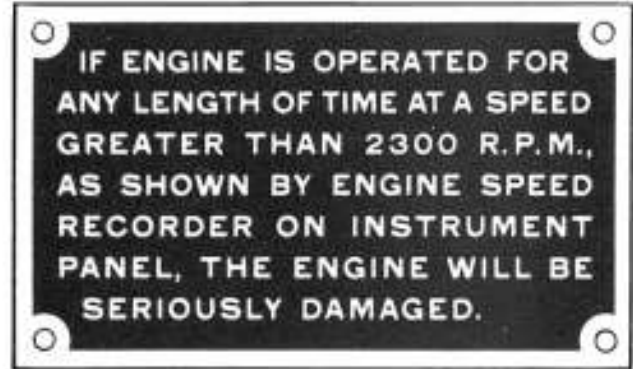
Special instructions governing the operation of units appear on plates mounted in the cab. Serial numbers of the engine, chassis, winch and power take-off are given on plates mounted on the units as indicated below the illustrations which follow.



SHIFTING PLATE

Located in middle of cowl inside cab.

Note: Wrecker P.T.O. shift shown at left side of plate only applies to Model 969 and does not appear on shift plates on other models.

**CAUTION PLATES**

Located over the windshield inside cab.

NOMENCLATURE		TRUCK, 4-TON INCI 6X6
SUPPLY ARM OR SERVICE		
MAINTAINING VEHICLE		QUARTERMASTER CORPS
MAKE AND MODEL		DIAMOND T MODEL
SERIAL NUMBER		
GROSS WEIGHT		LBS.
MAXIMUM PAYLOAD		8,000 LBS.
MAXIMUM TRAILED LOAD		11,000 LBS.
DATE OF DELIVERY		
RECOMMENDED BY MANUFACTURER		
OCTANE RATING OF GASOLINE		88
SAE GRADE OF OIL FOR SUMMER		30
SAE GRADE OF OIL FOR WINTER		20

IMPORTANT MAINTAIN OIL LEVEL BETWEEN $\frac{1}{2}$ AND $\frac{3}{4}$ MARK ON GAUGE

OIL PRESSURE AT WORKING SPEED TO LBS.

FIRING ORDER 1-5-3-6-2-4

ENGINE NO. SIZE

MODEL TAPRET EXH. INT.

DIAMOND T MOTOR CAR Co.
CHICAGO, ILL. U.S.A.

ENGINE PLATE

Located on left side of cylinder block.
(Engine number also stamped on a boss at the upper front corner on the manifold side.)

CHASSIS PLATE

Located on left side of cowl under hood.

MEAD MORRISON WINCH

MODEL NO. SERIAL NO.

GIVE MODEL AND SERIAL NUMBERS

PATENT NUMBERS

1417 343	1478 756	1531 539
1473 248	1515 402	1595 167

GAR WOOD INDUSTRIES, Inc.
DETROIT, MICHIGAN

MADE IN U.S.A. USE TRANSMISSION OIL

MEAD MORRISON TAKE-OFF

SERIAL NUMBER

GIVE SERIAL NUMBER WHEN ORDERING PARTS

MADE IN U.S.A.

GAR WOOD INDUSTRIES Inc.
DETROIT, MICHIGAN

POWER TAKE-OFF SERIAL PLATE

Located on power take-off shifting cover.

WINCH PLATE

Located on top of gear box on winch.

WINCH CAPACITY 15000 POUNDS

ON FIRST LAYER OF ROPE IN LOW SPEED OF TAKE-OFF. LINE SPEEDS REQUIRE THAT WHEN THIS WINCH IS USED TO ASSIST THIS VEHICLE WITH WHEELS DRIVING, THE TAKE-OFF SHOULD BE IN LOW SPEED, TRANSMISSION IN LOW GEAR, WITH TRANSFER CASE IN LOW RANGE.

VEHICLE AND WINCH GUARANTEE REQUIRE THAT THE WINCH SHALL BE OPERATED AT ALL TIMES AS REQUIRED BY APPROPRIATE REGULATIONS.

GAR WOOD INDUSTRIES, Inc. DETROIT, MICH.

MFD. BY

ERNEST HOLMES CO.

CHATTANOOGA, TENN.

U. S. A.

CAT. No. MODEL No.

SERIAL No.

WRECKER SERIAL PLATE

(Model 969 only)
Located on right side of wrecker frame just back of cab.

WINCH CAUTION PLATE

Located in middle of cowl inside cab.

MAIN UNIT SERIAL NUMBERS AND TYPE DESIGNATIONS

Frame — Serial number stamped on right side rail over the front spring rear hanger.

Front Axle — The front axle serial number is stamped on the top of the housing banjo and that of the front axle carrier is on a boss beside the filler plug.

Rear Axles — The forward rear axle serial number is stamped on the rear face of the banjo, close to the deck, while that of the rear axle is located just above the filler plug. The serial numbers for both rear axle carriers are located on a boss at the top of the housing.

Transfer Case — The transfer case serial number is stamped on a boss on the case, next to the filler plug.

Transmission — The transmission serial number

is located either on the rear face of the case, to the left and just below the main shaft, or in some cases, to the left of the countershaft bearing cap.

Electrical Accessories — Generator, starting motor, distributor, starter switch and solenoid switch have plates designating model and manufacturing data. Generators also carry serial number on plate.

Steering Gear — Identification number is stamped on top of gear housing.

Battery — Type designation is stamped on cell connecting bar.

Air Compressor — Plate shows model and manufacturing data.

Governor — Plate shows serial number.

GENERAL DRIVING INSTRUCTIONS

Good driving is perhaps the most important requisite for long and satisfactory service of any automotive vehicle. A real driver is more than a machine with one hand on the transmission lever and the other on the steering wheel. He must be able to think and feel his truck. He must recognize any unnatural condition such as vibrations, scrapings, knocks, clicks, sluggishness, etc.

The following instruments, described later in this section, are provided to assist the driver in noticing unusual conditions and to give warning before trouble develops.

Fuel Gauge
Ammeter
Viscometer

Speedometer
Tachometer
Temperature Gauge
Oil Pressure Gauge

Front Battery Ammeter
Air Pressure Buzzer
Air Pressure Gauge

PRELIMINARY —

Before starting engine, check as follows:

1. See that there is sufficient oil in the crankcase and fuel in the fuel tank to cover the day's requirements. Watch for leaks in the fuel and oil lines.
2. The radiator must have sufficient water and the fan belt must be properly adjusted.
3. The tires must be properly inflated—65 lbs. pressure.
4. Check lights, horn and air brake equipment.

STARTING ENGINE —

1. Place transmission lever (31) in neutral position.
2. Set hand brake lever (33).
3. If the engine is cold, crack hand throttle (22) about 1/5 open, and pull choke button (18) until it is half open. These steps may not be necessary when the engine is warm. If it is very cold, it may be necessary to choke the engine more.
4. Insert ignition key into ignition switch (24) and turn to "on" position.
5. Push clutch pedal (30) to floor and hold there until engine starts.
6. Press starter button to start engine. If the engine doesn't start, do not ruin battery with prolonged starter operation.
7. Adjust the throttle and choke controls for even idling and release clutch pedal.

STARTING TRUCK —

It is important that the air pressure gauge reads at least 70 pounds before starting the vehicle.

1. Push clutch pedal (30) downward to disengage clutch.
2. The transfer case shifting lever (35) should be shifted into either high or low position. (When loaded or starting up-grade start in low range.)
3. Shift the transmission lever (31) into first speed. (See shifting diagram.)
4. Release hand brake lever (33).
5. Push down on accelerator pedal (27) to speed up the engine; gradually release the clutch pedal; feed sufficient gasoline to insure a smooth even start.

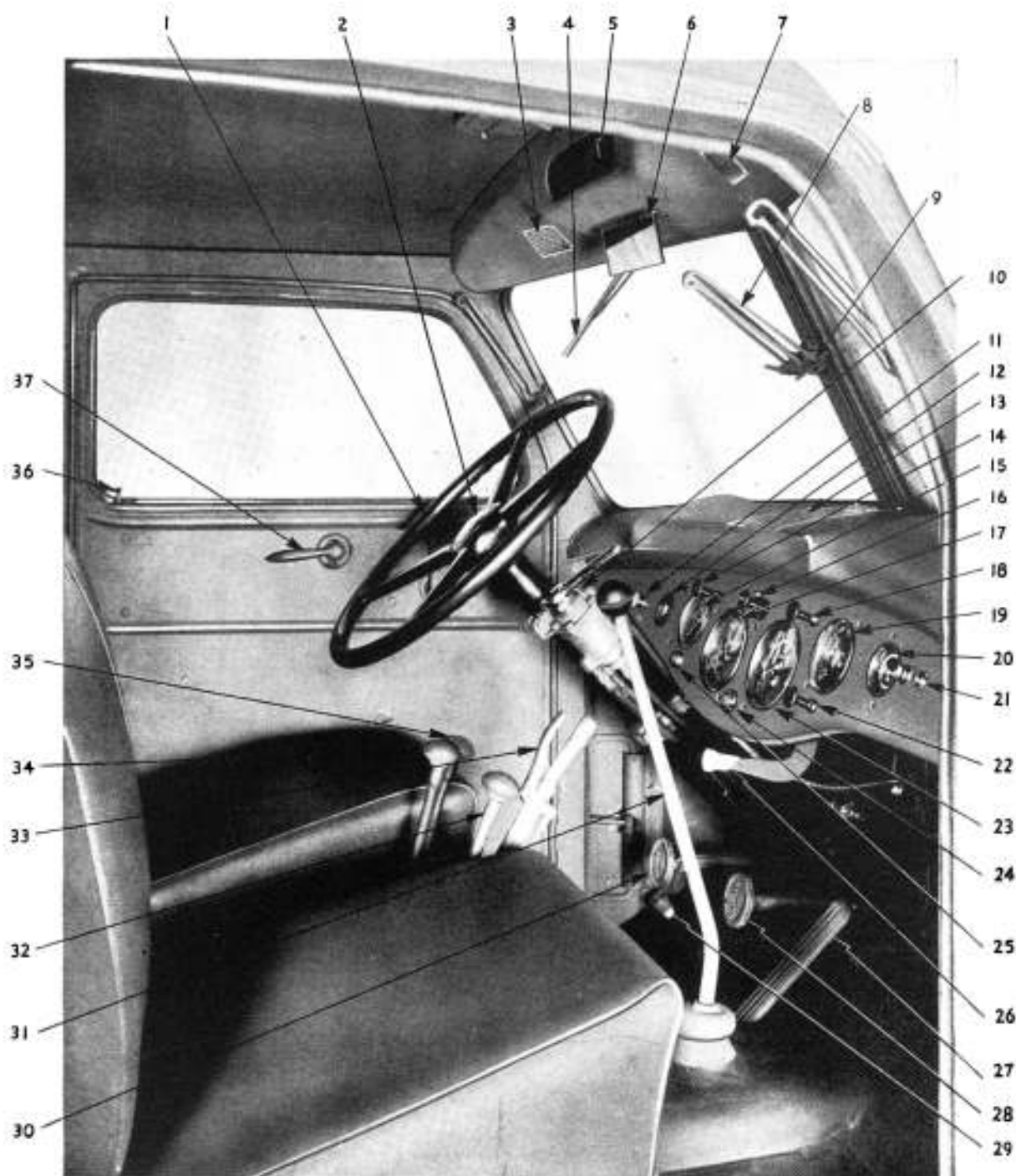
GEAR SHIFT — TRANSMISSION —

After the vehicle is started, to increase speed it is necessary to shift through the transmission to the high position. (See the shifting diagram).

As the truck increases speed, release the accelerator pedal, disengage the clutch and move the transmission lever into neutral and then into the second speed position. Then release the clutch pedal smoothly and at the same time accelerate the engine.

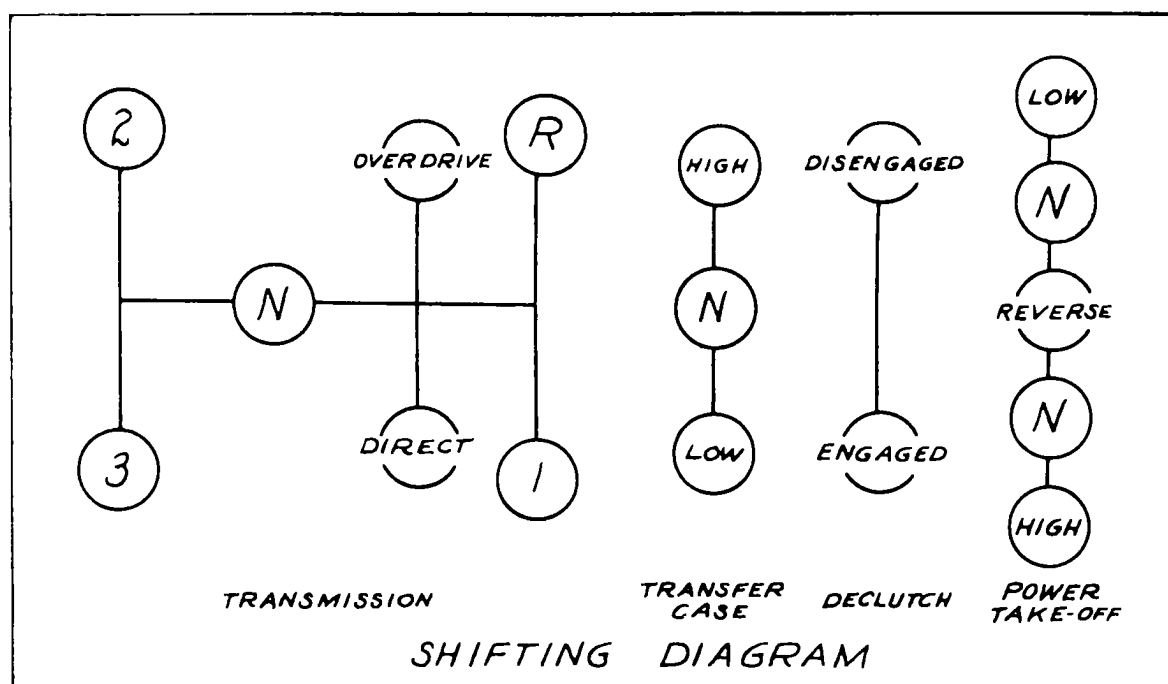
Repeat this for each step in the transmission until it is in driving gear. Shifting should be accomplished with a smooth, positive, and yet unhurried, movement of the transmission lever.

CAB EQUIPMENT



- | | | | |
|--------------------------|-----------------------------|-----------------------------|-------------------------------|
| 1 Steering Wheel | 11 Windshield Wiper Control | 20 Viscometer | 29 Dimmer Switch |
| 2 Horn Button | 12 Front Battery Ammeter | 21 Windshield Wiper Control | 30 Clutch Pedal |
| 3 Warning Plate | 13 Winch Caution Plate | 22 Throttle Button | 31 Transmission Lever |
| 4 Windshield Wiper | 14 Shifting Plate | 23 Speedometer | 32 Power Take-off Shift Lever |
| 5 Glove Compartment | 15 Spark Control | 24 Ignition Switch | 33 Hand Brake Lever |
| 6 Rear View Mirror | 16 Tachometer | 25 Tachometer Set Hand Lock | 34 Declutching Lever |
| 7 Caution Plate | 17 Main Light Switch | 26 Cowl Vent Control Handle | 35 Transfer Case Shift Lever |
| 8 Windshield Sector Arm | 18 Instrument Cluster | 27 Accelerator Pedal | 36 Night Latch Button |
| 9 Sector Arm Thumb Screw | 19 Air Pressure Gauge | 28 Brake Pedal | 37 Remote Control Handle |

GEAR SHIFT — TRANSMISSION — (Continued)



The tachometer is a valuable aid to intelligent gear ratio selections in the transmission. Best performance will be obtained with the engine operating between 1800 R.P.M. and 2300 R.P.M. If conditions are such that the vehicle cannot maintain its speed in the gear ratio being used, shift down in the transmission to keep the engine operating between the recommended limits. When shifting up in the transmission, do not select a higher ratio until after the engine speed reaches 1800 R.P.M.

When it is necessary to reverse the truck, follow the procedure outlined for starting the truck but shift into reverse position in the transmission.

It is very important that every shift made is complete and the gears fully in mesh. Incomplete shifting leads to uneven gear tooth wear and expensive repair. With a little experience the driver will feel the pop-pets engage when gears are completely in mesh.

It is good driving practice to drop a step in the transmission before the vehicle loses too much speed and the engine starts to labor. It is easiest to double-clutch when shifting into a lower gear as follows:

1. Disengage clutch and release accelerator pedal.
2. Move transmission lever into neutral position.
3. Release clutch pedal and accelerate engine to synchronize it with vehicle speed.
4. Disengage the clutch once again and shift into lower gear.
5. Engage clutch smoothly while accelerating the engine.

Important—Never force transmission lever into position or shift into lower gears at high engine speeds. When going down hill, it is recommended that the same gear ratio in the transmission be used as would be required in climbing that hill.

GEAR SHIFT — TRANSFER CASE —

It is good practice to operate the vehicle in high range over hard surfaced terrain when there is easy rolling. When there are extreme grades, or when the conditions are so difficult as to require high traction, the low range should be utilized, especially when heavily loaded, to help the engine to "hold on" in the main transmission.

The shift from high to low speed should never be attempted unless the vehicle is standing still or being operated at low speeds.

1. Disengage the clutch and move the shifting lever to a neutral position.

2. Release clutch and accelerate engine.

3. Disengage the clutch again and move the shift lever into the low position.

4. Release clutch and accelerate engine to synchronize with vehicle speed.

Important—Shift smoothly, never forcing the shifting lever as a sudden shock of gear engagement is likely to damage the transmitting parts.

The shift from low to high may be accomplished at any speed, whether the vehicle is in motion or standing still. Follow the same procedure outlined above except shift into high in the third step.

FRONT AXLE ENGAGEMENT —

The front axle may be engaged or disengaged at any speed. It will be found easier to operate the declutching lever (34) with the vehicle in motion. It is not necessary to use the clutch when engaging or disengaging the front axle.

It is not possible to drive in the low range with the front axle declutched because of stops on the transfer case and declutcher control levers. When in the high range, it is possible to engage or disengage the front axle at will. This is advantageous under easy rolling conditions where the front drive is not required.

HOW TO STOP THE TRUCK —

This vehicle is equipped with air brakes providing exceptionally great braking capacity. A person inexperienced with this type of brakes must exercise caution until quite familiar with them, for his own as well as his passengers' comfort and safety.

1. Release accelerator pedal and depress the brake pedal (28) gradually to apply the brakes smoothly.
2. When the truck's speed is down to from ten to fifteen miles per hour disengage the clutch and shift the transmission into neutral.
3. When the vehicle is completely stopped, release clutch pedal, set hand brake and release brake pedal.

When another unit is trailed behind this vehicle, the air lines are arranged so that when the foot pedal is depressed the brakes are applied on both the truck and the trailed unit. However, the hand brake valve will operate only the trailer brakes.

WINCH OPERATION —

The power take-off is used to obtain motive power for winch operation. The power take-off unit has a high and a low speed forward, one reverse speed and two neutral positions, as illustrated on the shifting diagram above the dash. An automatic brake is provided on the worm shaft to sustain the load while the take-off is being shifted.

Important—Follow instructions on the winch caution plate in cab.

Hooking On—Disengage the sliding clutch on the winch and pull the cable from the drum the necessary length. If the winch line is under a strain, shift the take-off into reverse.

Pulling—It is first necessary to engage the sliding clutch, seeing to it that the shift handle poppets are locked. Then depress the clutch pedal and shift the power take-off lever (32) into the low position. (When the load is light it is possible to use the high range). The clutch pedal is then released and the engine accelerated to pick up the load.

Important—Winch pulling speeds are based on an engine speed of 1000 R.P.M., which should not be exceeded in winch operation.

Stopping—To stop pulling, it is necessary to release the clutch pedal and shift the power take-off into neutral.

Reversing—To reverse the winch, it is necessary to disengage the clutch, slip the take-off lever into reverse and to release the clutch pedal. When reversing it is not necessary to accelerate the engine.

COLD WEATHER OPERATION —

Several additional precautions are necessary in cold weather. If the temperature is at any time below freezing (32° F.) an anti-freeze solution may be used in the cooling system to prevent freezing.

It is important to get the operating temperature of the engine up to normal (160° to 180°) as quickly as possible and to keep the temperature up to normal at all times using a radiator cover when necessary.

Avoid the use of the choke as much as possible. Too rich a mixture will increase the amount of unburned fuel that will wash the oil from the cylinder walls and get down into the crankcase to dilute the oil. To help avoid this, allow several minutes for the engine to warm up after it is started and before the load is applied.

The use of a better grade of fuel in cold weather will help minimize crankcase dilution. Some fuels contain traces of sulphur which in presence of normal products of combustion will unite to form acids that will attack metal surfaces.

Change oil more frequently in cold weather. Frequent oil changing will help to rectify the more rapid dilution and increased condensation that may occur in cold weather.

Use an oil light enough in body to flow at a temperature 10° lower than the lowest expected. Observation of the above precautions will reduce the formation of "sludge" in the crankcase to clog the oil screen and oil passages.

CAB EQUIPMENT —

(Numbers refer to illustration on page 0-6.)

Windshield Sector Arms—(8) These arms are located on each side of each windshield and will guide and support the glass with the aid of the adjusting screws.

Windshield Sector Arm Adjusting Screws

(9) — After loosening these thumb screws, the windshields may be opened outward and upward in an arc hinging at the top. The windshields may be held in any desired position by tightening these screws. Each windshield swings independently of the other.

Windshield Wipers — (4) — Dual windshield wipers are provided, each wiper being controlled independently. The wipers are operated by air pressure and swing in a wide arc for clear vision. Control valves are mounted on either end of the dash (11 and 21). Wiper speed is controlled by turning these knobs.

Glove Compartment — (5) — This compartment is located above the "V" in the windshield and provides a convenient space for small articles.

Ventilation — Adequate ventilation is assured with three different ventilating systems. A top ventilator is located in the roof, a conventional type ventilator is located in the cowl and side ventilators are provided on the cowl sides.

Front Battery Ammeter — (12) — An indicating ammeter (without graduations) is mounted on the left side of the dash. It indicates when the front battery (which does not register on the ammeter in the charging circuit) is not being charged.