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PART ONE—INTRODUCTION

Section I GENERAL

1. SCOPE.

a. These instructions are published for the information and guidance of the personnel to whom this equipment is assigned. They contain information on the operation and maintenance of the German Volkswagen as well as descriptions of the major units and their functions in relation to the other components of the vehicle.

b. This manual has the following arrangement.

(1) Part One, Introduction, contains description and data.

(2) Part Two, Operating Instructions, contains instructions for the operation of the vehicle, with description and location of the controls and instruments.

(3) Part Three, Maintenance Instructions, contains information needed for the performance of the scheduled lubrication and preventive maintenance services, and instructions for maintenance operations which can ordinarily be performed by using organizations (first and second echelons).

(4) The Appendix contains instructions for shipment and limited storage, and a list of references which may provide helpful information concerning operation or maintenance.

c. The operations described in this manual are based on the availability of necessary parts, accessories, and tools. Conditions will arise in which the items referred to in the manual are not available since they cannot be requisitioned through usual channels. In these cases, individual initiative must be resorted to when repairs are required.

2. RECORDS.

a. Forms and records which may be provided for use in performing prescribed operations are listed below with brief explanations of each. In case of Volkswagen, use of these forms will be governed by tactical situation and extent to which vehicle is employed.

(1) STANDARD FORM NO. 26, DRIVER'S REPORT—ACCIDENT, MOTOR TRANSPORTATION. One copy of this form should be kept with the vehicle at all times. In case of an accident resulting in injury or property damage, it should be filled out by the driver on the spot, or as promptly as practical thereafter.

(2) WAR DEPARTMENT FORM NO. 48, DRIVER'S TRIP TICKET AND PREVENTIVE MAINTENANCE SERVICE RECORD. This form, prop-

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erly executed, is furnished to the driver when his vehicle is dispatched on non-tactical missions. The driver and the official user of the vehicle complete, in detail, appropriate parts of this form. These forms need not be issued for vehicles in convoy or on tactical missions. The reverse side of this form contains the driver's daily and weekly preventive maintenance service reminder schedule.

(3) W.D., A.G.O. FORM NO. 6, DUTY ROSTER. This form, slightly modified, is used for scheduling and maintaining a record of vehicle maintenance operations. It may be used for lubrication records.

(4) W.D., A.G.O. FORM NO. 461, PREVENTIVE MAINTENANCE SERVICE AND TECHNICAL INSPECTION WORK SHEET FOR WHEELED AND HALF-TRACK VEHICLES. This form is used for all 1,000-mile (monthly) and 6,000-mile (semiannual) maintenance services and all technical inspections performed on wheeled or half-track vehicles.

Section II**DESCRIPTION AND DATA****3. DESCRIPTION.**

a. **General.** The Volkswagen is a four-wheeled, rubber-tired, rear axle drive personnel carrier and reconnaissance car, comparable in purpose and size to the American $\frac{1}{4}$ -ton 4x4 truck. No propeller shaft, as such, is used; the engine, transmission, and differential comprise a unit structure which is secured to the floor at the extreme rear end of the vehicle. Access to the engine is provided by a hinged door at the rear of the body. The vehicle has no frame. Instead, a base stamping comprising the floor of the vehicle is ribbed and provided with a central tunnel to give desired stiffness, to form the foundation of the vehicle. The main fuel tank is located under the front body panel on the right-hand side of the vehicle. The spare tire is carried on top of the front body panel.

b. **Engine.** The engine is an air-cooled, four-cylinder, four-cycle, horizontally-opposed type. Intake and exhaust valves are located in the cylinder head and are operated by conventional rocker arms and push rods.

c. **Transmission.** The transmission is the selective, sliding-gear type. Four speeds forward and one reverse are available. Differing from American vehicles, no direct drive is used. The fourth speed forward is an overdrive, having a ratio of 0.80 to 1. A detailed description of the transmission is contained in section XX.

DESCRIPTION AND DATA

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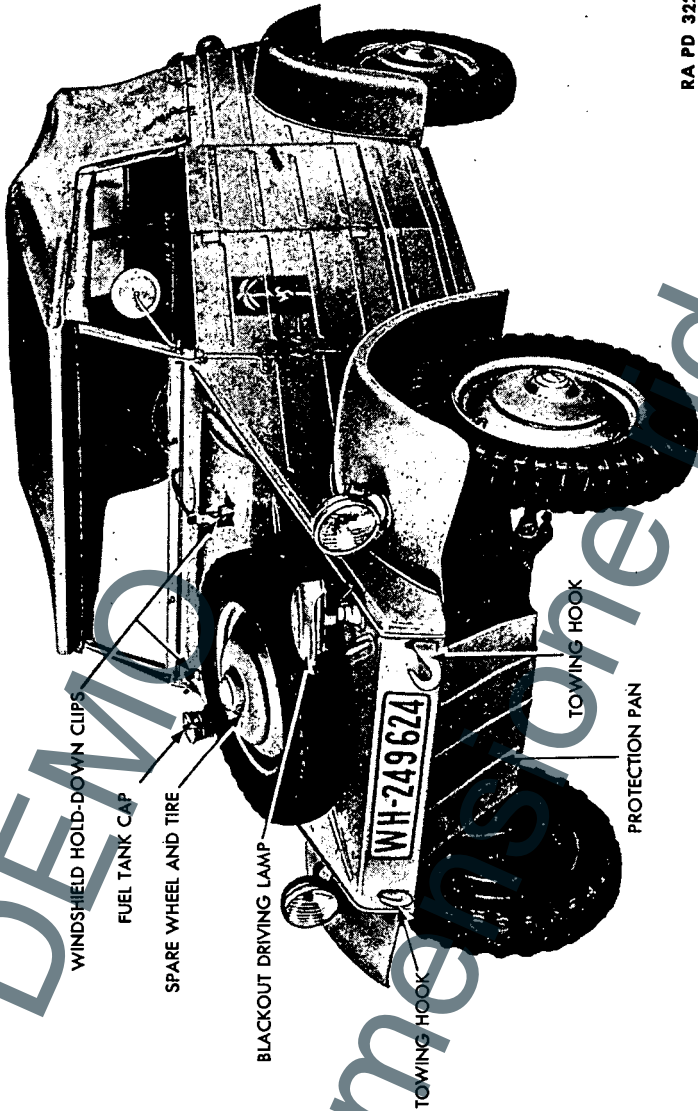
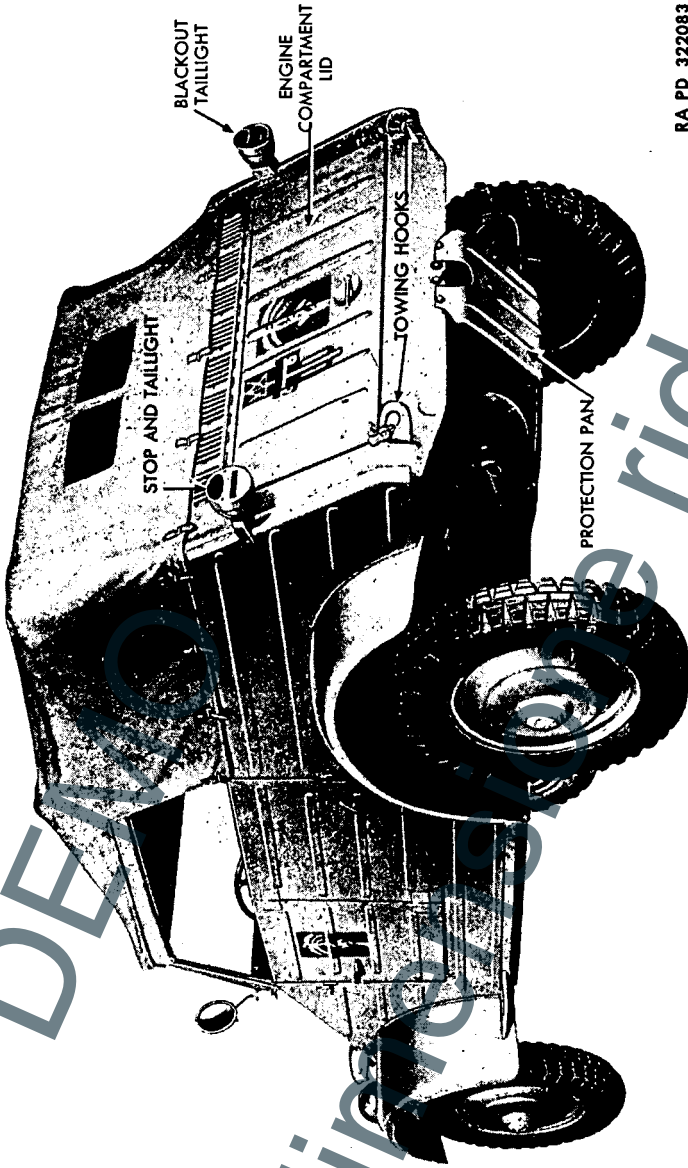


Figure 1—Volkswagen—Left Front View

GERMAN VOLKSWAGEN



RA PD 322083

Figure 2—Volkswagen—Left Rear View

DESCRIPTION AND DATA

d. Differential. A positive locking differential is used in place of spider gears. Whenever excessive friction is built up, the differential locks, thereby transmitting torque equally to the two driving wheels. A detailed description of the differential is contained in section XX.

e. Suspension. All wheels are independently sprung. The two front wheels are sprung on pairs of torsion rods mounted transversely on the vehicle, with the wheel kingpins being supported on a parallelogram linkage. The two rear wheels are stabilized laterally from the differential housing, and oscillate vertically about centers of the universal joints which are attached to the sides of the differential housing. Suspension of the rear wheels is by torsion arms attached to each end of a torsion rod mounted transversely on the vehicle.

f. Steering Gear. Steering wheel and steering mechanism are of the conventional type commonly used in American vehicles.

g. Braking System. Service brakes operate on all four wheels. These are mechanical brakes, actuated by cables attached to the foot brake pedal. The parking brake, through the same system of cables, also operates the service brakes on all four wheels.

4. TABULATED DATA.

a. Vehicle Specifications

	Metric	U. S.
Wheel base	2,400 mm	7 ft 10½ in.
Length, overall	3,740 mm	12 ft 3¼ in.
Width, overall	1,600 mm	5 ft 5 in.
Height (top up)	1,650 mm	5 ft 3 in.
Height (top down)	1,111 mm	3 ft 8 in.
Tire size		5.25-16
Tire air pressure (front)	1.4 atmospheres	20.5 lb
Tire air pressure (rear)	1.8 atmospheres	26.5 lb
Tread (front)	1,356 mm	53.39 in.
Tread (rear)	1,360 mm	53.54 in.
Crew	4	
Weight (empty)	725 kg	1,598 lb
Weight (loaded)	1,160 kg	2,557 lb
Net load	450 kg	992 lb
Ground clearance	290 mm	11.4 in.
Foot brake works on		4 wheels
Hand brake works on		4 wheels
Wheels		Disk
Type of rims		Drop center
Front wheel toe-in	3-6 mm	⅛-¼ in.
Camber		2½ deg
Caster		5 deg

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b. Performance.

	Metric	U. S.
Minimum speed	3 kmph	1.8 mph
Maximum speed	80 kmph	49.7 mph
Climbing ability in loose sand		40 pct.
Climbing ability on the road		45 pct.
Fording depth (without wetting engine)	450 mm	17.7 in.
Operating radius	400-450 km	250-280 miles

c. Capacities.

Main gas tank	30 liters	7.925 gal
Normal fuel consumption	8 liters per 100 kilometers	30 mpg (approx)
Transmission and differential for lubricant change	2.5 liters	2.6 qt
For filling after overhaul	3.0 liters	3.1 qt
Engine		
For oil change	2.5 liters	2.6 qt
For filling after overhaul	3.0 liters	3.1 qt
Steering mechanism	0.25 liters	1/2 pt

5. CONVERSION TABLE.

Metric to U. S.	U. S. to Metric
1 millimeter equals 0.0394 inches	1 inch equals 25.4 millimeters
1 liter equals 0.264 gallons	1 gallon equals 3.785 liters
1 kilogram equals 2.205 pounds	1 pound equals 0.454 kilograms
1 kilometer equals 0.621 miles	1 mile equals 1.609 kilometers

Section III

TOOLS, PARTS, AND ACCESSORIES

6. TOOLS.

a. All maintenance operations listed in this manual can be performed with standard tools available to the first and second echelon maintenance organizations. Open-end and socket wrenches used must be in 1/64-inch sizes to properly fit the metric scale of bolt and nut sizes.

7. PARTS AND ACCESSORIES.

a. Since this materiel is of German manufacture, replacement of various units with corresponding units of American manufacture is limited to minor parts which can be adapted for use on this vehicle by

TOOLS, PARTS, AND ACCESSORIES

improvising mounting facilities. Examples of such replacement units headlights, coil, wiring, and some of the instruments in the instrument panel. Otherwise, parts replacement will have to be handled by cannibalization.

b. Many vehicles will be found from which the tools and equipment have been removed, lost, or damaged. These may be replaced by cannibalization or by requisition of comparable American equipment through usual channels. Below is a suggested list of American equipment which will be found valuable and useful for proper operation and maintenance of the vehicle. This list is for information only and is not to be used as a basis for requisition.

Tools and Equipment	Federal Stock No.
Ax, chopping, single-bit.....	41-A-1277
Extinguisher, fire.....	58-E-202
Gage, tire pressure.....	8-G-615
Gun, lubr., hand-type.....	41-G-1330-60
Oiler, straight spout, 1/2-pt.....	13-O-1530
Pliers, combination, slip joint, 6-in.....	41-P-1650
Pump, tire, w/chuck.....	8-P-5000
Screwdriver, common, 6-in.....	41-S-1104
Shovel, D-handle, rd. pt.....	41-S-3170
Wrench, adjustable, automobile type, 11-in.....	41-W-448
Wrench, adjustable, crescent type, 8-in.....	41-W-486

DEMO dimension photo

GERMAN VOLKSWAGEN

- A—HORN BUTTON
- B—WINDSHIELD WIPER
- C—FUSE BOX
- D—AMMETER
- E—OIL PRESSURE GAGE
- F—SPEEDOMETER
- G—BRIGHT LIGHT INDICATOR
- H—DIRECTION SIGNAL INDICATOR
- J—FUSE BOX
- K—DIRECTION SIGNAL SWITCH
- L—SPOTLIGHT
- M—FUEL COCK
- N—MULTIPLE SWITCH
- P—LIGHT SWITCH
- Q—GEARSHIFT LEVER
- R—IGNITION KEY
- S—DASHBOARD LIGHT SWITCH
- T—TROUBLE LAMP SOCKET
- U—CRANKING MOTOR BUTTON
- V—CHOKE
- W—EMERGENCY BRAKE
- X—ACCELERATOR
- Y—BRAKE PEDAL
- Z—CLUTCH PEDAL
- AA—FRONT LIGHT SWITCH

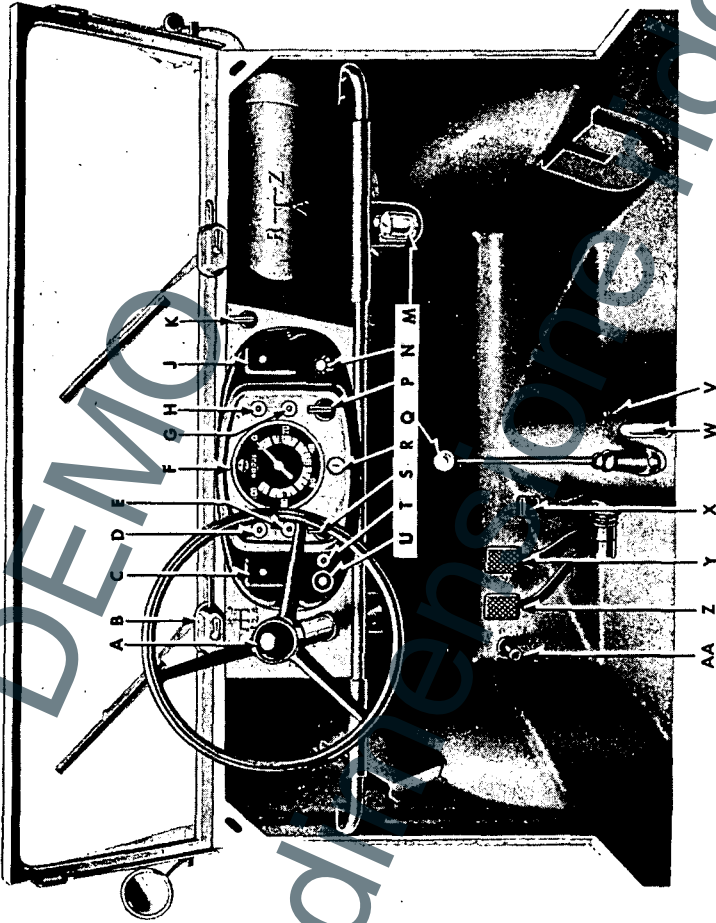


Figure 3—Instrument Panel, Brake, and Shift Levers

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PART TWO—OPERATING INSTRUCTIONS

Section IV

CONTROLS AND INSTRUMENTS

8. CONTROLS.

a. **Ignition Switch.** The ignition switch is located at the lower center of the instrument panel. A key is furnished to operate the switch. When the key is inserted and turned, the switch serves to close electrical circuits between the battery and ignition coil, direction indicator light, oil pressure light, and dash light switch. All the other circuits are opened and closed by their respective switches.

b. **Horn Button.** The horn button is located in the hub of the steering wheel. When the button is depressed, it closes the circuit between the source of electrical power and the horn, and thus actuates the horn.

c. **Cranking Motor Button.** The cranking motor button is located on the extreme lower left side of the instrument panel. When the cranking motor button is depressed, it closes the electrical circuit between the cranking motor and battery. The cranking motor rotates and, through a series of gears, rotates the engine crankshaft.

d. **Fuse Boxes.** Two rectangular fuse boxes, one at each end, are located on the instrument panel. Most of the electrical circuits in the vehicle pass through one, or the other, of these boxes. In the event a circuit is shorted or overloaded, the fuse burns out. This opens the circuit and prevents damage to any item of equipment, or injury to personnel.

e. **Trouble Lamp Socket.** This socket provides an electrical outlet in which a corded lamp may be plugged, thus providing portable illumination. The socket is located just to the right of the cranking motor button.

f. **Dash Light Switch.** The dash light switch is located on the instrument panel to the right of the trouble lamp socket. When turned on, it closes the circuit between the source of electrical power and the dash light, thus turning on the dash light.

g. **Light Switch.** The light switch is located on the instrument panel just beneath the bright light indicator. When the light switch is turned on it operates the service headlights and service tail and stop light.

h. **Multiple Switch.** The multiple switch is located just to the right of the light switch. The multiple switch has three positions: one

ENGINE DESCRIPTION AND MAINTENANCE IN VEHICLE



RA PD 322089

Figure 5—Engine Installed

GERMAN VOLKSWAGEN

ventional rocker arms and pushrods. An engine oil strainer is located in the bottom of the crankcase, and an oil cooler is mounted in the blower housing. Maximum economy of the engine is obtained by using a low grade of fuel. Tests prove that 80 octane fuel, diluted with 20 percent kerosene, offers smoothest carburetor operation and most economical engine operation.

b. Data.

Types: Four-cycle, horizontally
opposed, air-cooled

Number of cylinders

Bore

Stroke

AMA horsepower

Piston displacement

Compression ratio

Firing order

Ignition occurs

Suspension

Cylinders, cast in

Pistons:

Material

Length

Piston rings:

Type

Width—compression

Width—oil retaining

Wristpin:

Type

Diameter

Length

Retention

Valves:

Type

Location

Diameter of inlet port

Diameter of exhaust port

Inlet stem diameter

Exhaust stem diameter

Inlet stem length

Exhaust stem length

Metric System

U. S. System

4

4

70-mm

2¾ in.

64.29-mm

2½¹/₃₂ in.

11.2

11.2

999.59 cc

61 cu. in.

6.1 to 1

6.1 to 1

1-4-3-2

1-4-3-2

5 degrees before top dead center

5 degrees before top dead center

Rubber, 3 point

Rubber, 3 point

One piece, fins integral

One piece, fins integral

Aluminum alloy

Aluminum alloy

70.64-mm

2²⁵/₃₂ in.

2 compression,
1 oil control

2 compression,
1 oil control

3.17 mm

1/8 in.

4.76 mm

3/16 in.

Full floating

Full floating

19.84 mm

25⁵/₃₂ in.

34.13 mm

11¹/₃₂ in.

Snap rings

Snap rings

Poppet

Poppet

In head

In head

23.81 mm

15¹⁵/₁₆ in.

24.60 mm

3¹/₃₂ in.

6.74 mm

17¹/₆₄ in.

6.74 mm

17¹/₆₄ in.

101.60 mm

4 in.

101.60 mm

4 in.

GERMAN VOLKSWAGEN

install the driving gear. Be sure the tongue of the driving gear shaft enters the groove in the end of the camshaft. Install a new gasket over the cover studs and install the oil pump cover, lock washers, and nuts.

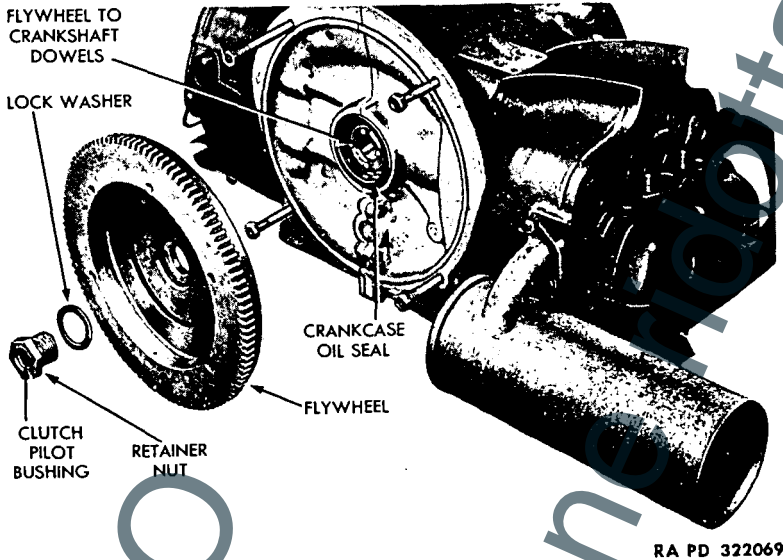


Figure 20—Flywheel Removed

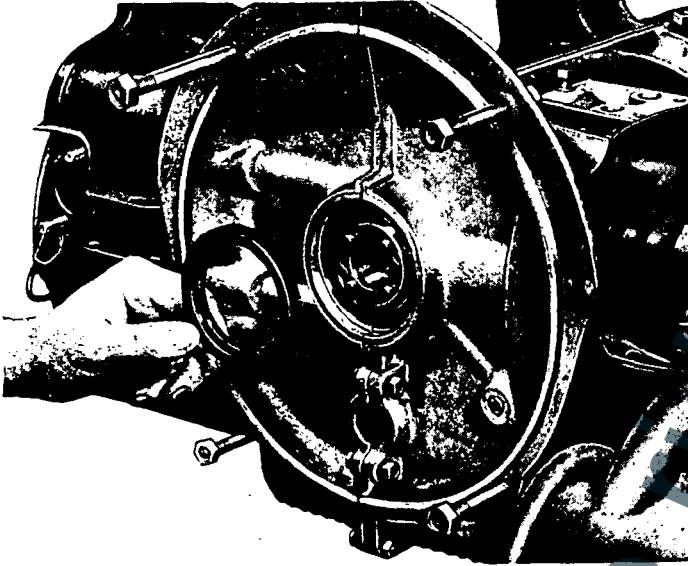
62. OIL SEAL.

a. The crankcase rear oil seal is of rubber composition and must be inspected frequently to guard against oil loss through leakage.

b. **Removal.** Remove the clutch pilot bushing retainer nut and lock washer and remove the flywheel from the crankshaft. Loosen the three crankcase clamping bolts directly below the oil seal and one clamping bolt on the top of the engine nearest the flywheel flange. Carefully wedge a heavy screwdriver in the crankcase parting joint, so as to spread the crankcase slightly. Pull the oil seal from its seat.

c. **Installation.** Place a new oil seal in the seat in the crankcase, being sure it fits tightly against the seat flange. Remove the screwdriver from the parting joint. Tighten the clamping bolt on the top of the engine and the three bolts directly below the oil seal. Place the flywheel on the studs of the crankshaft and install the lock washer and clutch pilot bushing retainer nut. Tighten the retainer nut securely.

FUEL AND AIR INTAKE AND EXHAUST SYSTEMS



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Figure 21—Removing Crankcase Oil Seal

Section XV

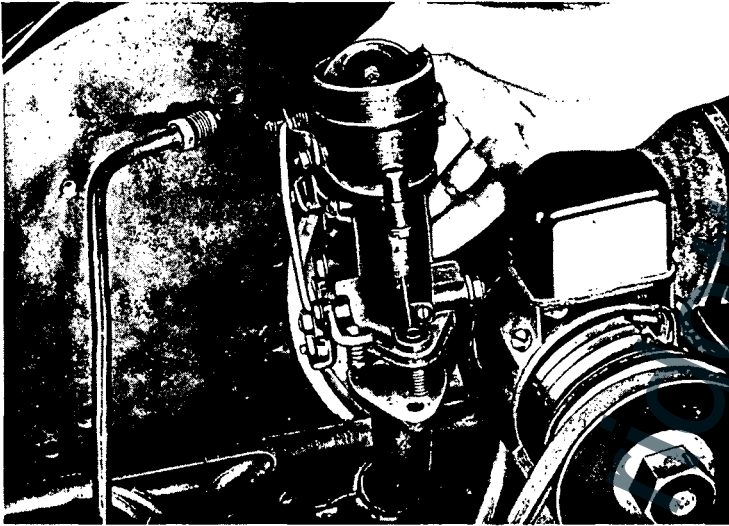
FUEL AND AIR INTAKE AND EXHAUST SYSTEMS

63. DESCRIPTION.

a. **Fuel and Air Intake.** Fuel for the Volkswagen is carried in an 8-gallon tank located under the right front cowling. The filler pipe for the tank projects through the cowling and is equipped with a snap-on cap. From the tank, fuel flows into a fuel strainer and sediment bowl mounted beneath the fuel tank; then is forced up through a wire mesh screen and into the flexible fuel line leading to the fuel pump, which is mounted on the engine. The fuel pump then forces the fuel into a fuel line to the carburetor which, in turn, introduces the fuel into the intake manifold. Air is drawn into the carburetor from a port in the left wall of the engine compartment. An oil-bath air cleaner removes dust from the air and conducts the air to the carburetor air intake.

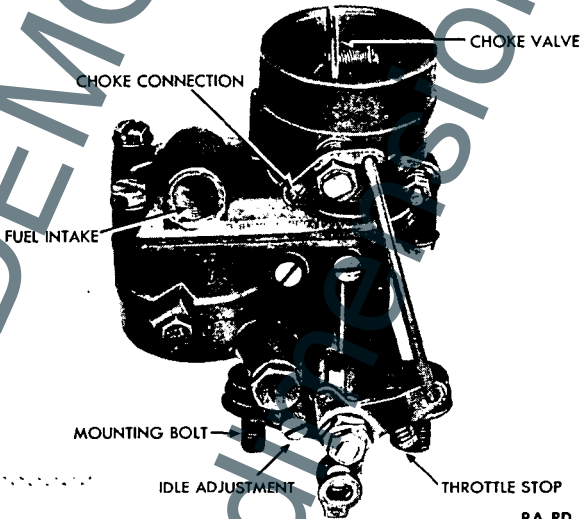
b. **Exhaust System.** The exhaust system carries the burned gas from the engine to the atmosphere. The system consists of four exhaust manifolds (one for each cylinder), two mufflers, and four tail pipes.

GERMAN VOLKSWAGEN



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Figure 22—Carburetor Removal



RA PD 322043

Figure 23—Carburetor Removed

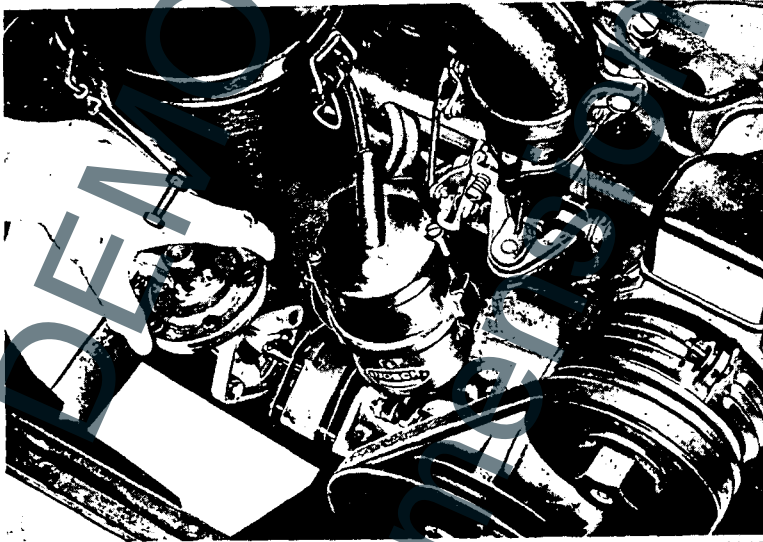
FUEL AND AIR INTAKE AND EXHAUST SYSTEMS**64. CARBURETOR.**

a. **Description.** The Volkswagen uses the downdraft type of carburetor. It is simple in design and, because its primary aim is economy of operation, no acceleration pump is used. The idle mixture adjustment and the throttle stop screw are the only external adjustments provided (fig. 23).

b. **Adjustment of Carburetor.** After the engine has been warmed up to a normal operating temperature and is turning over about 500 revolutions per minute, turn the idle mixture adjustment (fig. 23) clockwise to its seat and back off the screw until smoothest idle performance is obtained.

c. **Removal** (fig. 22). Remove the oil-bath air cleaner (par. 66). Remove the fuel line from the carburetor fuel intake. Remove the choke and throttle connections. Remove the two hex nuts and lock washers from the carburetor mount, and lift the carburetor up and away from the intake manifold flange.

d. **Installation.** Install the carburetor on the flange of the intake manifold, and secure with two hex nuts and lock washers. Connect the choke and throttle rods on the carburetor. Install the fuel line from the fuel pump to the fuel intake port on the carburetor. Install the oil-bath air cleaner (par. 66).



RA PD 322095

Figure 24—Fuel Pump Removal

GERMAN VOLKSWAGEN

of the housing onto the control pedal shaft. Install the parking brake linkage rod through the front of the housing, yoke end first, and so it fits into the groove of the junction arm. Connect the hand brake lever to the linkage rod, and secure with pin and cotter pin at the clevis. Install the accelerator pedal and bracket on the control pedal shaft, and secure with cap screws and lock washers. Install the brake pedal return spring and the brake pedal onto the control shaft, and fasten the spring to the accelerator bracket and brake pedal. Secure the pedal with a lock washer and cap screw. Install the clutch pedal shaft through the control pedal shaft from right-hand side, and install clutch control on the shaft. Secure the clutch pedal with a straight pin through the shaft. Using a wooden stick or any similar extension, reach into the front of the tunnel housing and maneuver the clutch cable onto the clutch control shaft hook. Install the front brake cables at the junction arm and backing plate. Install the rear brake cables into the rear of the tunnel housing (fig. 50) and secure to the junction arm. Adjust the brakes as outlined in paragraph 103 and install the eight cap screws which hold the protection pan at the front of the vehicle.

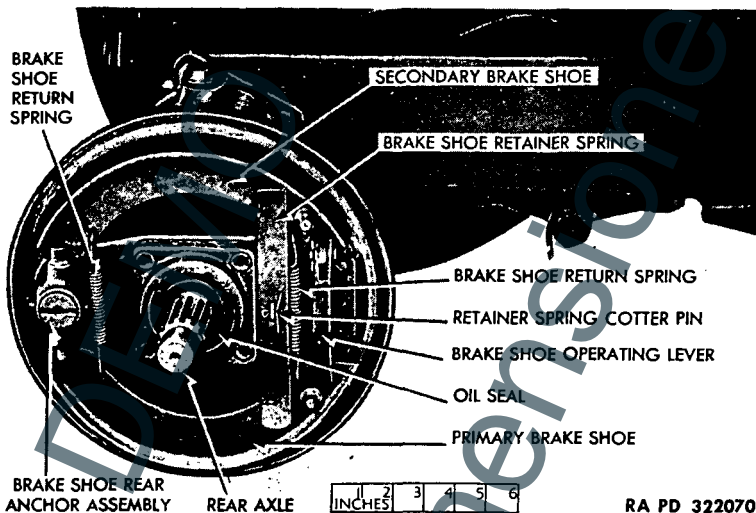


Figure 51—Brake Assembly Installed

103. SHOE ASSEMBLIES.

a. Description. The brake shoe assembly consists of the primary brake shoe, secondary brake shoe, two return springs, shoe retainer spring, two brake shoe anchors, and the brake shoe operating lever

SERVICE AND PARKING BRAKES

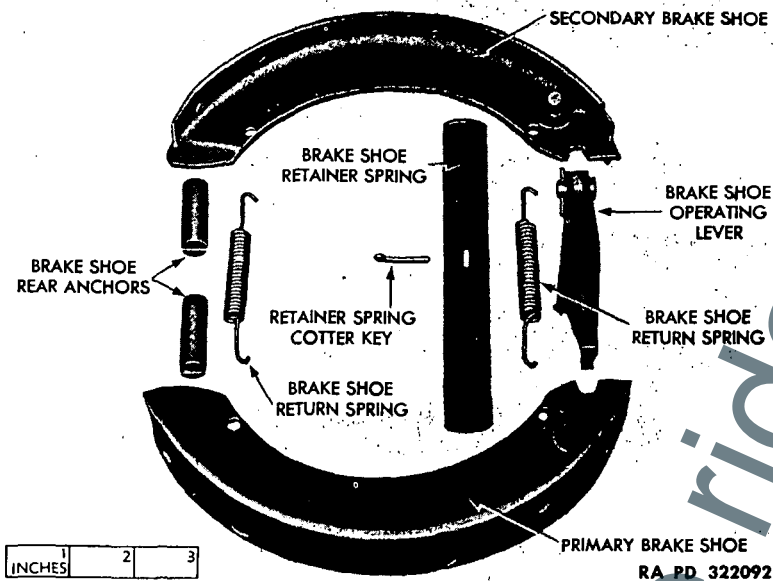


Figure 52—Brake Shoes Removed

(fig. 51). The shoes are secured to the backing plate by the rear anchor and by the retainer spring. The brake is adjusted at the anchors and at the cable which attaches to the operating lever. A toggle action at the lever expands the shoes against the brake drum as the cable is pulled.

b. **Adjustment.** A minor brake adjustment consists of tightening the adjusting wedge bolt (fig. 53). Turn the adjusting wedge bolt in one notch at a time until the desired brake action is obtained. If proper adjustment of the shoes cannot be obtained by this method, it indicates that the brake cable has stretched. Tightening the brake cable clamping nut (fig. 54) will shorten the cable and compensate for slight cable stretch.

c. **Removal.** Remove the wheel hub cap and lugs on the drum. Remove the wheel. Remove drum assembly. On front wheels, remove two wheel nuts, two washers, outer bearing race, outer bearing and brake drum. On rear wheels, remove cotter pin and nut, and then loosen drum by a sharp hammer blow on the end of the axle. **NOTE:** Use a piece of brass or copper to protect end of shaft. Disconnect cable attaching plate at rear of backing plate. Remove cotter pin from the retainer spring and remove the two return springs from the shoes. Lift off the shoes, anchor pins, and operating lever (fig. 52).

GERMAN VOLKSWAGEN

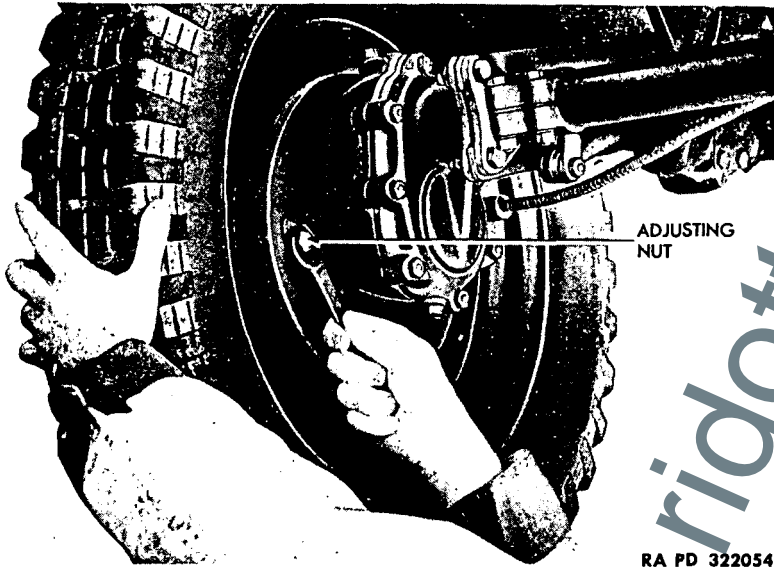


Figure 53—Adjusting Brake Shoes

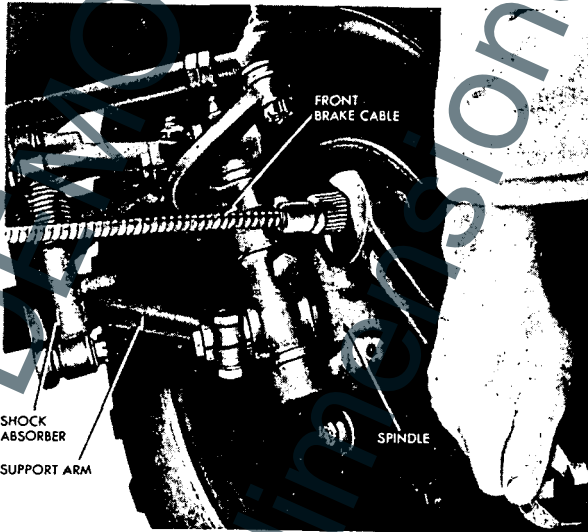


Figure 54—Adjusting Brake Cable

STEERING SYSTEM

d. **Installation.** Install the anchor pins into the backing plate boss, and place the brake shoes in the grooves on the pins. Install rear return spring. Install the brake operating lever. Connect the brake cable to the brake shoe operating lever, and place the shoes into the grooves of the lever. Install front return spring. Install shoe retainer spring and secure with cotter pin (fig. 51). Install brake drum assembly on front wheel, after bearings have been coated with grease, replace inner bearing, brake drum, outer bearing, race, flat washer and nut. Pull nut up until tight and back off $\frac{1}{4}$ turn, then check nut with lock washer and nut. Lock tightly without changing position of inside nut. Replace grease cap. On rear wheel, replace brake drum and secure tightly with nut and cotter pin. Install wheel. Adjust the brakes (step b above).

Section XXIV

STEERING SYSTEM

104. DESCRIPTION.

a. The steering gear is the worm and sector type, and differs from the conventional construction in that the steering worm shaft is short, and an extension is used to connect the worm shaft to the steering wheel. The sector shaft is fitted with a socket into which the sector bearing is located. The sector bearing is designed to mesh with the threads of the worm shaft. The sector shaft extends through the steering gear housing, and the steering Pitman arm attaches to the lower end of the sector shaft. The opposite end of the Pitman arm is designed to accommodate two ball studs which are located in the inner ends of the tie rods. The tie rod ball studs are attached to the Pitman arm, and the tie rods extend to the steering knuckle arms. Ball studs in the outer ends of the tie rods are attached to the steering knuckle arms.

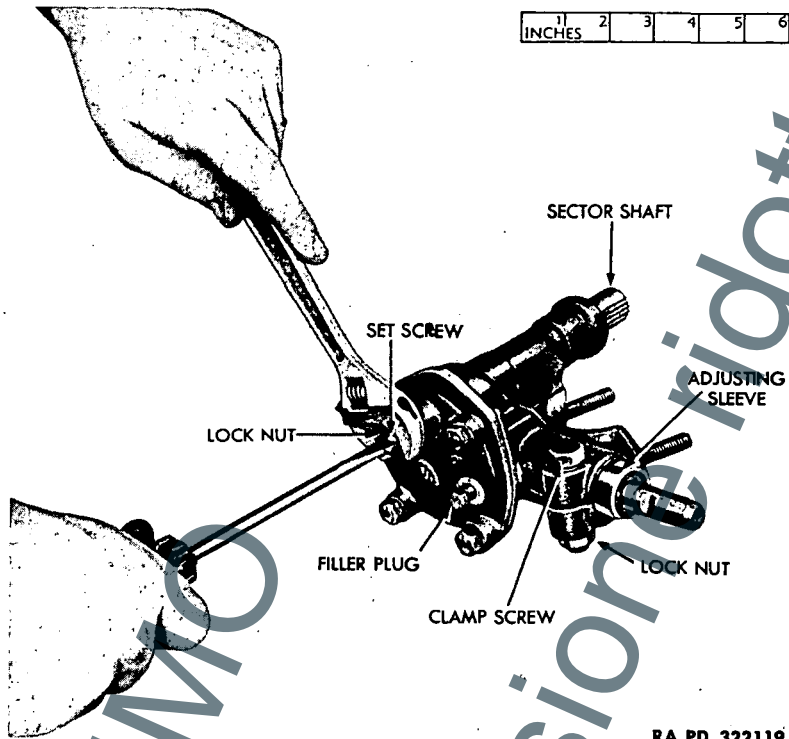
105. STEERING PITMAN ARM.

a. **Description.** The steering Pitman arm is located beneath the steering gear assembly, and fastens to the sector shaft by a clamp bolt, nut, and lock washer. The ball end of the steering Pitman arm provides for two ball and socket joints to which are attached the left and right tie rods. The conventional drag link is not used on this vehicle.

b. **Removal.** Remove the protection pan from the front of the vehicle by removing the eight cap screws which hold it in place. Remove the clamp bolt, nut, and lock washer at the base of the

GERMAN VOLKSWAGEN

sector shaft, and slide the Pitman arm from the sector shaft. Remove the two ball and socket joints from the other end of the steering Pitman arm.



RA PD 322119

Figure 55—Adjusting Steering Gear

c. **Installation.** Install the steering Pitman arm to the sector shaft and secure with a clamp bolt, lock washer, and nut. Install two ball and socket joints on the other end of the arm, and install the left and right tie rods to the joints. Install the protection pan on the front of the vehicle, and install and tighten the eight cap screws.

106. STEERING GEAR ASSEMBLY

a. **Description.** The steering gear assembly is mounted to the upper torque rod housing at the front left center of the vehicle (fig. 45).

b. **Adjustment.** There are two adjustments provided for the steering, one to eliminate backlash between the steering gear worm

STEERING SYSTEM

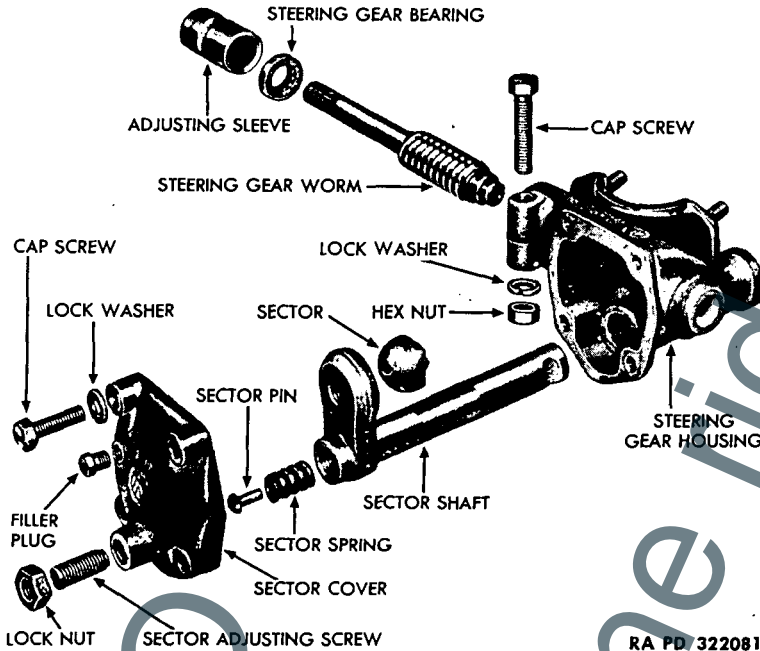


Figure 56—Steering Gear Disassembled

and its bearing, and the other to eliminate backlash between the steering gear worm and the sector. To eliminate backlash between the steering gear worm and bearings, turn the front wheels to the straight ahead position. Loosen the clamp screw at the top of the steering gear housing, and tighten the adjusting sleeve (fig. 56). Tighten the sleeve only enough to eliminate up-and-down motion of the steering gear worm, and tighten the housing clamp screw. To eliminate backlash between the steering gear worm and sector, turn the front wheels to the straight ahead position. Loosen the sector adjusting screw lock nut (fig. 56) and tighten the sector adjusting screw until no backlash exists between the sector and the steering gear worm. Tighten the adjusting screw lock nut.

c. **Removal.** Remove the protection pan on the front of the vehicle. Remove the steering Pitman arm (par. 105). Remove the clamp bolt and nut at the steering column connection, and separate the steering column from the steering gear assembly. Remove nuts and lock washers from mounting studs on the torque rod housing bracket, and remove the steering gear assembly.

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d. **Installation.** Install the steering gear assembly on the torque rod housing bracket, and secure lock washers and nuts to the mounting studs. Connect the steering column to the steering gear assembly, and tighten the clamp bolt, lock washer, and nut. Install the Pitman arm to the sector shaft (par. 105).

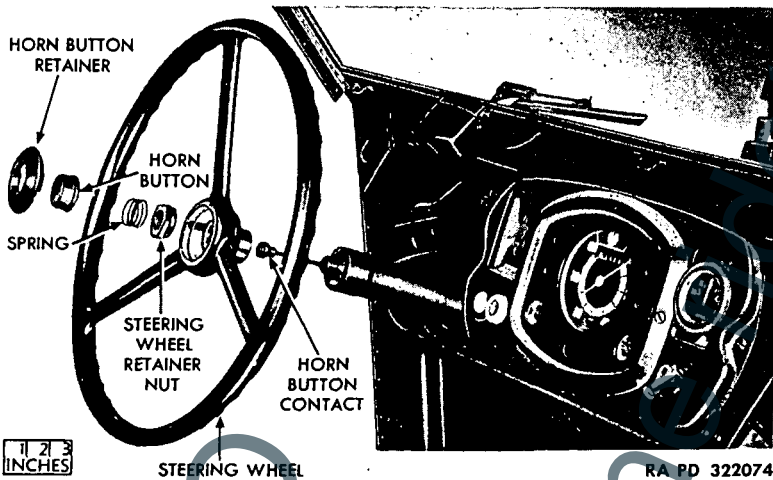


Figure 57—Steering Wheel Removed

107. STEERING WHEEL ASSEMBLY.

a. **Description.** The steering wheel is the standard type commonly used in American vehicles. The steering wheel assembly consists of the horn button retainer, horn button, spring, retainer nut, wheel, and horn button contact.

b. **Removal.** Pry the horn button retainer from the hub of the wheel. Lift out the horn button and spring, and remove the steering wheel retainer nut. The wheel is splined to the steering column tube, and care should be taken in order to keep from damaging the splines when it is lifted off (fig. 57). Pull the steering wheel from the steering tube.

c. **Installation.** Install the steering wheel on the splined steering tube, allowing the horn button contact wire to fit through the wheel hub. Tighten the retainer nut to draw the wheel onto the tube, and install the spring and horn button. Secure the button with the tight-fitting retainer which presses into position over the button.

Section XXV

TIRES, TUBES, AND WHEELS

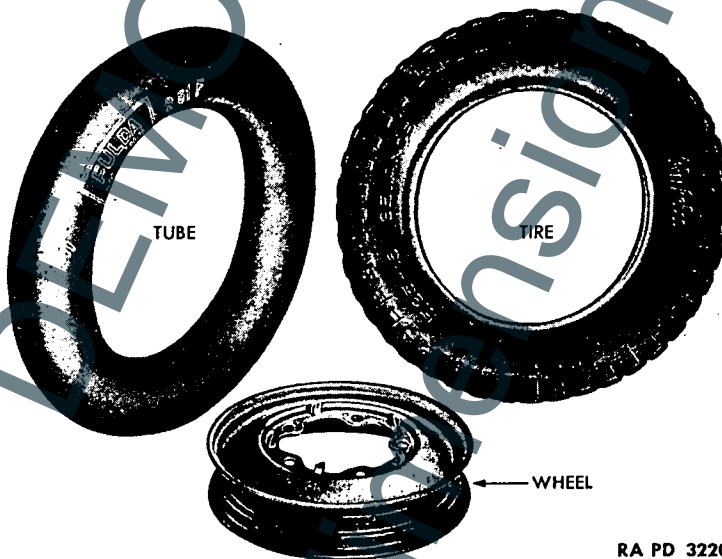
108. DESCRIPTION.

a. The Volkswagen is equipped with five steel disk wheels with deep set rims, and low-pressure synthetic tires and tubes, size 5.25-16. Air pressure should be approximately 20 pounds in front tires and 26 pounds in the rear tires.

109. TIRES, TUBES, AND WHEELS.

a. **Removal.** Jack up the vehicle and pry the hub cap from the wheel. Remove lug nuts and pull wheel and tire from drum. Remove valve core from valve stem to deflate tire thoroughly. Pry the tire from the rim, and pull the inner tube out of the tire.

b. **Installation.** Install tube in tire. Install tire and tube on wheel rim, using care to avoid pinching the tube. Inflate tire to proper pressure and install wheel on the drum, and secure with lug nuts; tighten the nuts gradually and alternate from side to side to ensure a proper fit. Lower vehicle to ground and withdraw the jack.



RA PD 322056

Figure 58—Wheel, Tire, and Tube

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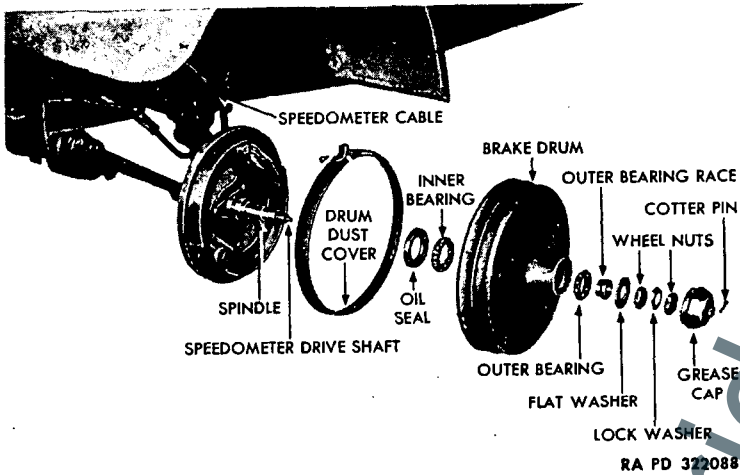


Figure 59—Left Front Brake Drum and Wheel Bearing Disassembled

110. ADJUSTMENT.

a. No provision is made for adjusting the caster or camber angles of the front wheels of the Volkswagen.

b. Toe-in can be adjusted as follows: Place the front wheels in a straight ahead position; measure the distance between the rear of the front wheels and the front of the front wheels, being sure that these measurements are taken at the same height from the ground in each case. If the distance between the front of the front wheels is

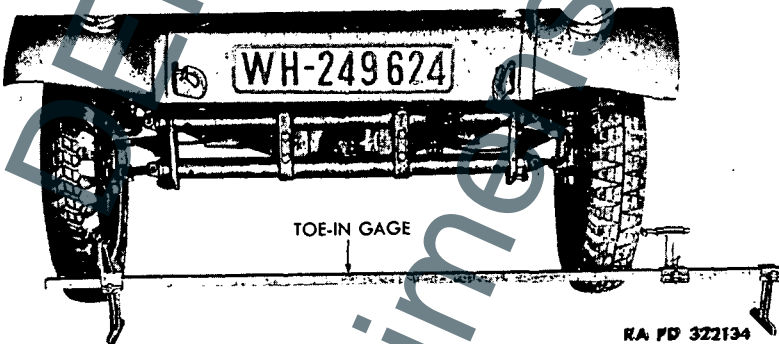
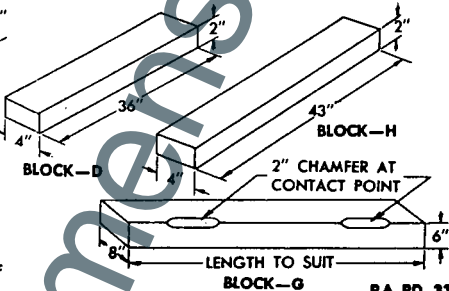
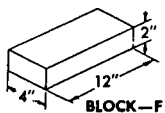
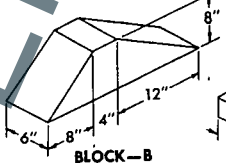
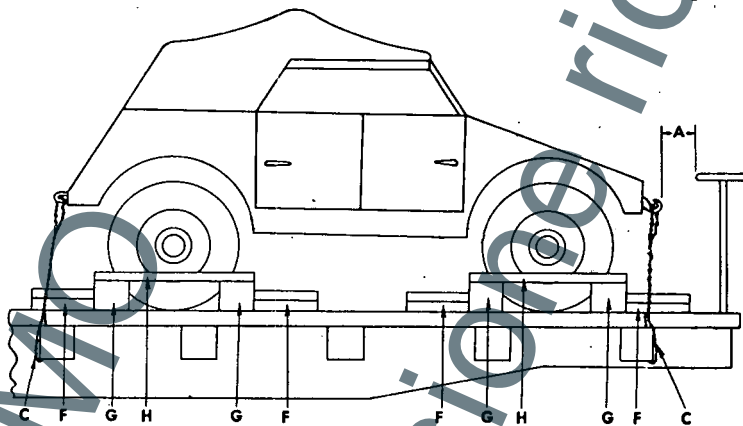
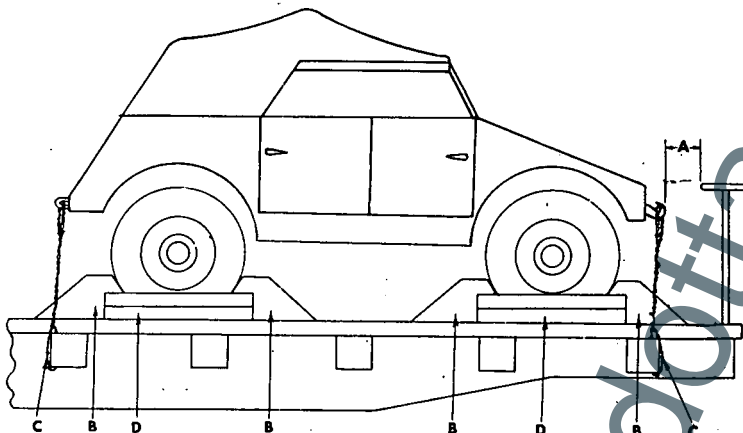


Figure 60—Front Wheel Toe-in Adjustment

SHIPMENT AND TEMPORARY STORAGE



RA PD 336917

Figure 63—Blocking Requirements for Securing Vehicles on Railroad Cars

Section XXX

REFERENCES

129. PUBLICATIONS INDEXES.

a. The following publications indexes should be consulted frequently for latest changes to, or revisions of, the publications given in this list of references and for new publications relating to materiel covered in this manual:

Introduction to Ordnance Catalog (explains SNL system)	ASF Cat ORD-1 IOC
Ordnance publications for supply index (index to SNL's)	ASF Cat ORD-2 OPSI
Index to ordnance publications (lists FM's, TM's, TC's and TB's of interest to Ordnance personnel, MWO's, OPSR's, BSD, S of SR's, OSSC's and OFSB's. Includes alphabetical listing of Ordnance major items with publications pertaining thereto)	OFSB 1-1
List of publications for training (lists MR's, MTP's, T/BA's, T/A's, and FM's, TM's and TR's concerning training)	FM 21-6
List of training films, film strips and film bulletins (lists TF's, FS's, and FB's by serial number and subject)	FM 21-7
Military training aids (lists graphic training aids, models, devices, and displays)	FM 21-8

130. STANDARD NOMENCLATURE LISTS.

Cleaning, preserving and lubrication materials, recoil fluids, special oils, and miscellaneous related items	SNL K-1
Soldering, brazing and welding materials, gases and related items	SNL K-2
Tool-sets, motor transport	SNL N-19

131. EXPLANATORY PUBLICATIONS.

a. **Fundamental Principles.**

Automotive brakes	TM 10-565
Automotive electricity	TM 10-580
Automotive lubrication	TM 10-540
Automotive power transmission units	TM 10-585
Basic maintenance manual	TM 38-250

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- | | |
|---|-----------|
| Chassis, body, and trailer units..... | TM 10-560 |
| Driver's manual | TM 10-460 |
| Driver selection and training..... | TM 21-300 |
| Electrical fundamentals | TM 1-455 |
| Fuels and carburetion..... | TM 10-550 |
| Military motor vehicles..... | AR 850-15 |
| Motor vehicle inspections and preventive
maintenance service | TM 9-2810 |
| Precautions in handling gasoline..... | AR 850-20 |
| Standard military motor vehicles..... | TM 9-2800 |
| The internal combustion engine..... | TM 10-570 |
| b. Maintenance and Repair. | |
| Cleaning, preserving, lubricating, and welding
materials, and similar items issued by the
Ordnance Department | TM 9-850 |
| Cold weather lubrication and service of com-
bat vehicles and automotive materiel | OFSB 6-41 |
| Maintenance and care of pneumatic tires and
rubber treads | TM 31-200 |
| c. Protection of Materiel. | |
| Camouflage | FM 5-20 |
| Chemical decontamination, materials and
equipment | TM 3-220 |
| Decontamination of armored force vehicles..... | FM 17-59 |
| Defense against chemical attack..... | FM 21-40 |
| Explosives and demolitions..... | FM 5-25 |
| Military chemistry and chemical agents..... | TM 3-215 |
| d. Storage and Shipment. | |
| Registration of motor vehicles..... | AR 850-10 |
| Rules governing the loading of mechanized
and motorized army equipment, also major
caliber guns, for the United States Army
and Navy, on open top equipment published
by Operations and Maintenance Depart-
ment of Association of American Railroads. | |
| Storage of motor vehicle equipment | AR 850-18 |
| Ordnance field service storage and shipment
chart-group G major items | OSSC-6 |

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