

**OWNERS  
OPERATION AND SERVICE  
MANUAL**

**GAS MODELS GX-440, GX-444**



**E-Z-Go Division of Textron Inc.**

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**AUGUSTA, GEORGIA**

**MANUAL NUMBER 9020  
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## **INTRODUCTION**

This Operation and Service manual has been prepared to serve two purposes. First, it will acquaint the reader with the operation of the E-Z-GO product and assist him in performing minor service and repairs. Secondly, it will introduce to the mechanic the most efficient service specifications and procedures.

It is our hope that these procedures together with the trouble-shooting tips outlined herein will enable the customer to receive the best possible service from our product.

**Service Department**  
**E-Z-GO CAR,**  
**Textron Inc.**  
AUGUSTA, GEORGIA

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Polaris E-Z-Go  
Division of Textron Inc.

# SERVICE MANUAL

## GENERAL

MODEL  
GASOLINE  
SECTION A

### SPECIFICATIONS

Single Cylinder Two Cycle Engine, 244cc, Air Cooled, Reed Valve Intake, 5000 RPM Max. 12-Volt Electrical System — 60 Amp Hour Battery.

Float Bowl Type Carburetor with External Fuel Pump. Engine and Muffler mounted on vibration isolators.

Oversized Dry Type Air Filter.

Automatic Governor.

Automatic Torque Convertor.

Full Suspension with Coil Springs and Shock Absorbers.

Mechanical Wheel Brakes with Hill Lock and Automatic Release.

Crankshaft mounted Starter/Generator, Automatically controlled by Voltage Regulator.

Steering — Rack and Pinion Type.

CHASSIS — Rectangular Steel Tubing.

DIFFERENTIAL — Ratio 12.25:1

TURNING RADIUS — 7¼ ft.

TIRES — 8.50 x 8 (4-Ply Rating).

FUEL TANK — 4 Gallons.

HILL CLIMBING — 50% Grade.

BODY — All Steel Replaceable Panels.

SPEED — 12 M.P.H. \*See Caution. Page A4

	<b>GX-440 (3-Wheel)</b>	<b>GX-444 (4-Wheel)</b>
Length .....	91 in.	96 in.
Width .....	48 in.	48 in.
Wheel Base .....	61 in.	66 in.
Rear Wheel Tread .....	39¼ in.	39¼ in.
Ground Clearance .....	4¼ in.	4¼ in.
Weight .....	710 lbs.	785 lbs.

## Section A

### MODEL IDENTIFICATION

The Serial number of your E-Z-Go is stamped on a data plate on the right side of the dash housing. (Fig. 2A)

**IMPORTANT!** Always give these numbers when ordering parts for your car.

### GENERAL OPERATION

To operate your E-Z-GO, place the key in the ignition switch and turn to "on" position. Move the Forward-Reverse lever to the direction desired. Depress accelerator pedal to start and accelerate engine. When pressure is released from accelerator pedal, the engine automatically stops running.

If engine is cold, or does not start within 10 seconds, pull out choke knob until engine starts. As soon as engine starts, push choke knob back to the open position. The control emblem which is located directly below the ignition switch, Forward-Reverse lever, and Choke Control, identifies these controls. (See Fig. 1-A).

**IMPORTANT!** In selecting direction desired, the engine must be completely stopped before selecting forward from reverse, or reverse from forward.



FIG. 1 A

### OPERATING INSTRUCTIONS

The operating Instructions Decal is mounted on the dash scuff plate and can be easily read from the drivers seat. The instructions should be followed for proper operation of your E-Z-GO. (See Fig. 2 A).



FIG. 2 A

**BRAKES**

The brake pedal incorporates a Hill Brake feature for parking. To engage, push down on the top of pedal until the latch arm locks in place. The brake will automatically release when the accelerator is depressed. (See Fig. 3 A).



FIG. 3 A LOCKING HILL BRAKE

**ACCELERATOR**

Accelerator pedal has three functions. When depressed, hill brake is released, starter is energized and engine accelerated. When pedal is released the ignition circuit is de-energized and engine stops.

## **Section A**

### **FUEL GAUGE**

The fuel gauge for your E-Z-GO is in the form of a gauge/cap combination. It is a mechanical float-spiral type with no sending unit.

### **TOWING**

If, for some reason, your E-Z-GO has to be towed for any distance, the drive belt must be removed. See Clutch Section, this manual, for removal procedure.

### **SAFE DRIVING TIPS**

When car is to be left unattended, turn ignition key to "OFF" position, F&R lever in neutral, (straight up) and engage hill brake lock.

Slow down before making sharp turn.

Drive slowly when making turns on an incline.

Never use accelerator to hold on an incline — use the brake.

Use brake and hold speed down when descending an incline.

Drive straight up or down steep inclines.

Take extra care when driving in reverse.

Always bring car to a complete stop before shifting Forward-Reverse Control.

**CAUTION:** Do Not Operate your E-Z-Go Car in excess of 12 M.P.H.

Speeds in excess of 12 MPH may cause damage to the mechanical components, as well as being unsafe.



Polaris E-Z-Go  
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# SERVICE MANUAL

## SERVICE

**MODEL  
GASOLINE  
SECTION B**

**IMPORTANT:** It is in the best interest of both the car owner and servicing dealer to carefully follow the procedures recommended in this manual. Adequate preventive maintenance, applied at regular intervals, is the best guarantee for keeping your E-Z-GO Gasoline Car dependable and economical.

### SERVICING A NEW GASOLINE CAR

Before a new car is put in operation, it is recommended that the owner make a check on the items shown in the INITIAL SERVICE CHART below.

Service operations are described in pertinent sections of Service Manual. See Table of Contents for location.

#### INITIAL SERVICE CHART

Item	Service Operation
Battery	Check electrolyte level and charge condition.
Tires	Check pressure.
Brakes	Check operation and adjust if necessary.
Fuel	Fill tank with correct gas/oil mixture.

### DAILY CHECK LIST

After your E-Z-Go has been put into service, it is recommended that the following items be checked by the personnel handling the cars to make ready for each days' play. Personnel driving cars to and from the storage facility can be an asset to a proper maintenance program if trained to look, listen and feel for an unusual situation. This practice can be a great help in solving many maintenance problems in the minor stages while they can be corrected by simple adjustments, etc.

A. Examine car for damages or abuse, unusual to normal wear and tear.

1. Torn seats
2. Dents in body
3. Damaged or missed bag straps
4. Cuts in tires
5. Tire pressure
6. Mechanical damage, rods, etc.
7. Be sure hill brake will hold on hill and not drag or prevent car from rolling freely.
8. Be sure hill brake release works automatically with pedal.

## Section B

### DAILY CHECK LIST (Continued)

- B. Clean car in general.
  - 1. Wipe seats
  - 2. Clean floormat
  - 3. Remove trash from dash
  - 4. If wet, wash mud from underneath
- C. Listen for unusual noises while driving
  - 1. Rattles due to loose nuts
  - 2. Scraping sounds such as brakes dragging, etc.
  - 3. Unusual engine noises

### ENGINE FUEL AND LUBRICATION

The factory recommends that extreme caution be used during the first five (5) hours of operation of your new E-Z-GO. The critical factor during this time is the fuel/oil ratio. For the first five (5) hours a 40:1 ratio must be used. This is 3¼ fluid ounces of oil to one (1) gallon of gasoline. After this break-in period and throughout the life of your E-Z-GO, a ratio of 128:1 should be used. This 1 fluid ounce of oil to one (1) gallon of gasoline. The instruction decal for the fuel-oil ratio is located on the outside of the gas tank access door. (See Fig. 1 B)

**IMPORTANT:** Engine lubrication is provided **only** by mixing gasoline and oil. Always follow the manufacturer's recommendations.

- 1. Use only E-Z-GO recommended oil and regular leaded gasoline.
- 2. Always mix in correct proportions — thoroughly — and in a clean container.
- 3. Never attempt to mix fuel by adding oil to tank, putting gas in afterwards. This method will not mix properly. Pour oil and gasoline in a container or storage tank and agitate thoroughly. A good method to use for mixing fuel in a storage tank is as follows:

After filling tank, add required oil, insert pump hose nozzle in fill neck, start pump and circulate fuel several times.

Too little oil means inadequate lubrication, overheated cylinder and crankcase bearings; too much oil means spark plug fouling and rapid carbonization, all which may lead to engine damage and costly repairs.

### AIR CLEANER SERVICE

The Air Cleaner Assembly on your E-Z-GO provides a dual function: First, it provides clean, dustfree air to the engine, and second, it suppresses two-cycle intake noise. The filter element requires periodic cleaning for optimum engine life and performance. Daily servicing is advisable in extremely dusty areas.

To remove filter element, unscrew wing nut and remove upper body to expose element. Remove and clean or discard old element. Remove and clean lower body. Do not allow dust to drop into air duct. Re-install lower body (with dust unloader pointing down) element and upper body. Hand tighten wing nut.

**CAUTION:** This is a dry type cleaner. Do not use oil. Do not attempt to clean the element by beating or rapping it. Also, do not use gasoline or other volatile solvents to clean the element.



## ELEMENT CLEANING METHODS

## Section B

1. Compressed air is recommended when the cleaned element will be used immediately because a washed element must be dried before use.

Direct air through element from the inside through to the outside. Move the air nozzle up and down the pleats, while slowly rotating the element. Keep nozzle at least one (1) inch from pleats. Use air pressure of 100 PSI or below.

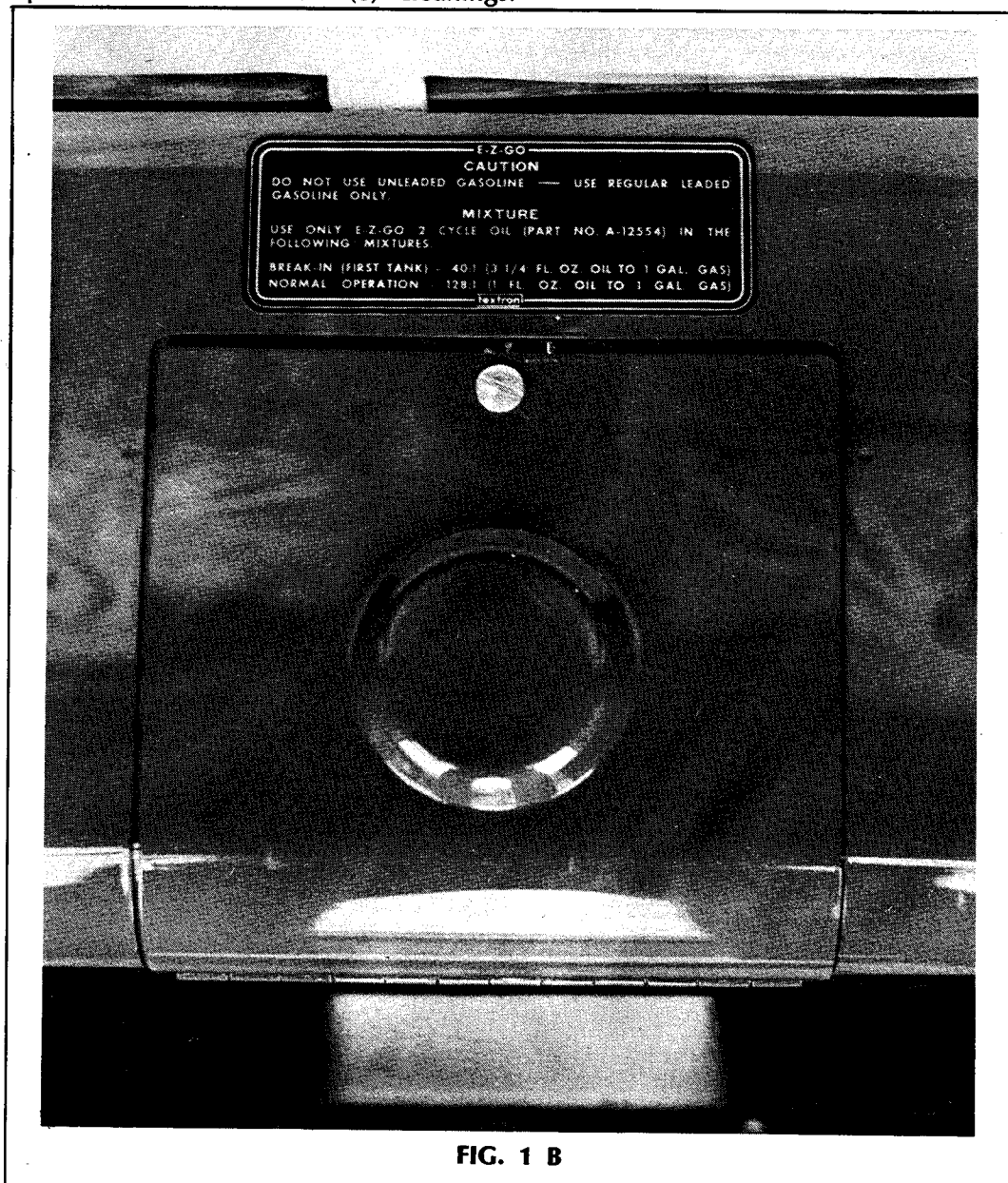
2. Wash with a non-sudsing detergent.

Rinse until water is clear. Use water pressure of 40 PSI or below.

Air dry or use warm flowing air, of maximum 150 degrees F. Do not use compressed air or light bulbs to speed drying process.

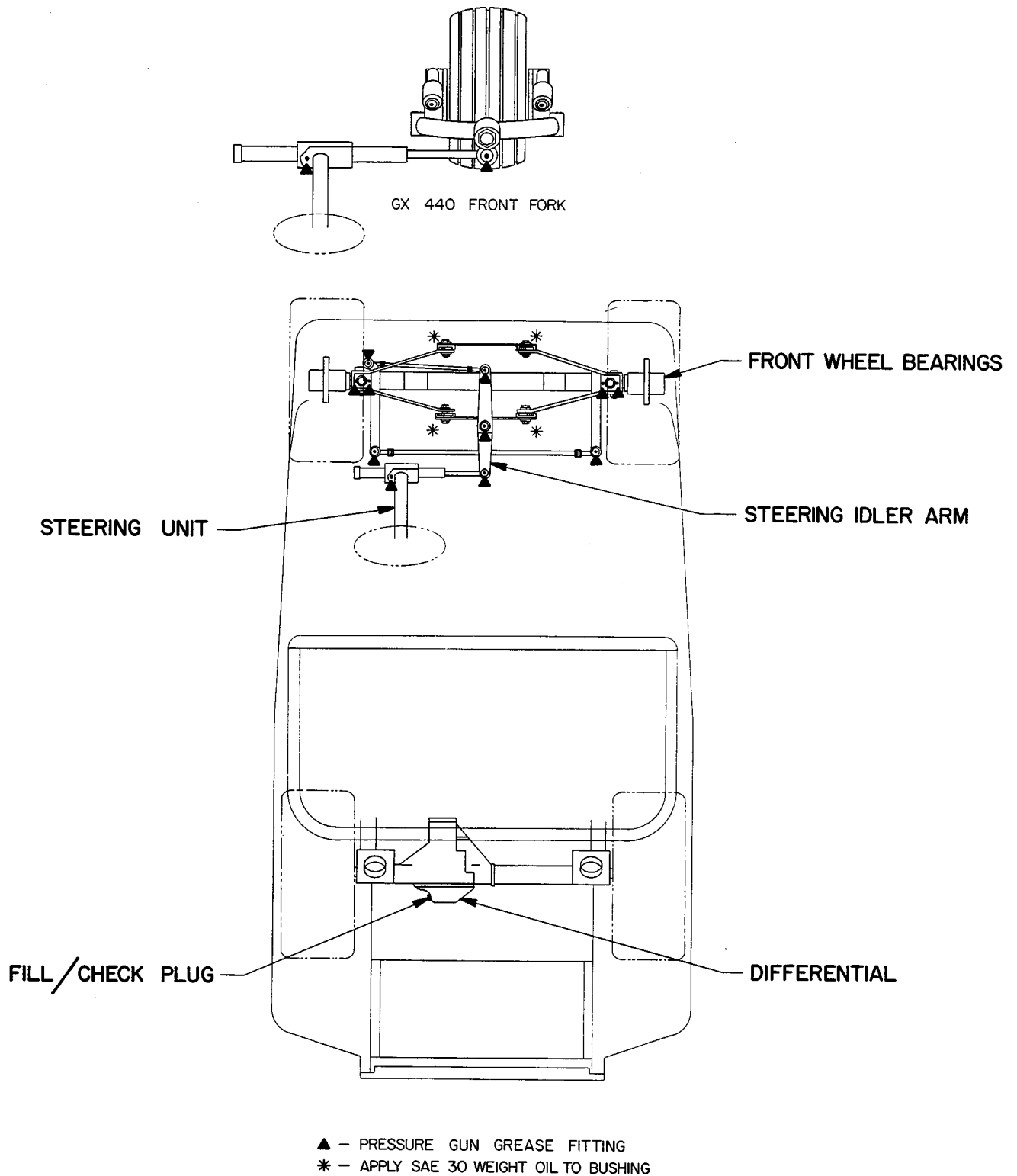
3. Inspection: Place bright light inside element and rotate element slowly. If any ruptures, holes or damaged gaskets are discovered, replace the element.

**NOTE:** Replace element after six (6) cleanings.



Section B

PERIODIC SERVICE SCHEDULE					
	DAILY	WEEKLY	MONTHLY	SEMIANNUAL	ANNUALLY
<b>BRAKES</b>	• CHECK (AND ADJUST IF NECESSARY) ON A DAILY BASIS <u>BEFORE</u>				
A. CHECK	X	CAR IS USED			
B. ADJUSTMENT		• AS REQUIRED			
<b>TIRES</b>	• EXAMINE DAILY FOR CUTS AND EXCESSIVE WEAR				
A. PRESSURE		X			
B. CONDITION	X				
<b>BATTERY</b>	• WIPE DIRT AND FOREIGN MATTER FROM TOP OF BATTERY				
A. CHECK	X				
B. CLEAN		X		• CLEAN TERMINALS	
C. ADD WATER		X		• REPLACE DEFECTIVE CAPS	
<b>AIR CLEANER</b>	• REPLACE AFTER SIX (6) CLEANINGS, OR ANNUALLY, WHICHEVER				
A. CHECK			X	OCCURS FIRST	
B. CLEAN			X	• CLEAN WITH PROPER SOLU.	
C. REPLACE					X
<b>FUEL FILTER</b>					
A. CHECK	• WHEN NECESSARY				
B. REPLACE					X
<b>HILL BRAKE AND LINKAGE</b>	• MAKE CERTAIN LINKAGE RODS ARE NOT BENT OR BINDING ON FRAME • USE LIGHT OIL ON MOVING PARTS				
A. CHECK		X			
B. LUBRICATE			X		
<b>FRONT WHEEL BRGS.</b>	• USE CHEVRON MOLY-GREASE 2				
A. ADJUSTMENT			X		
B. REPACK					X
<b>FORK BEARINGS</b>	• USE CHEVRON MOLY-GREASE 2				
A. REPACK					X
<b>DIFFERENTIAL LUB.</b>	• USE CHEVRON R P M DELO MULTI-SERVICE 200-30				
A. CHECK				X	
<b>FRONT WHEEL ALIGN.</b>	• SEE SERVICE SECTION FOR ALIGNMENT PROCEDURE				
3 & 4 WHEEL CARS			X		
<b>STEERING ASS'Y.</b>	• MAKE CERTAIN PINCH BOLTS ON ENDS OF TIE RODS ARE TIGHT				
A. CHECK			X	• CHEVRON MOLY-GREASE 2	
B. LUBRICATE LINKAGE				X	
<b>MUFFLER &amp; EXHAUST</b>	• CHECK FOR GASKET CONDITION AT CYLINDER				
A. INSPECT		X			
<b>CONTROL LINKAGE</b>					
ACCELERATOR CABLE		X		• CHECK CONDITION OF RUBBER WIPERS	
CHOKE CABLE		X		• CHECK ATTACHMENT AT CARBURETOR	
GOVERNOR CONTROL		X		• ADJUST AS REQUIRED	
ACTUATOR ROD		X		• CHECK FOR ROD BINDING ON FRAME	
A. CHECK		X		AND TIGHTNESS OF DISC	
B. ADJUSTMENT	• AS NECESSARY, REGARDLESS OF TIME INTERVAL				



LUBRICATION CHART

## **Section B**

### **TIRES**

Tire inflation and condition should be inspected on a daily basis. Recommended pressure for the standard 8.50 x 8 tire is 10/12 PSI. Inflation pressures should be checked when the tires are cool.

Tire inflation should be governed by the condition of your golf course. On hard fairways, it is desirable to have a slightly higher inflation pressure to prevent excessive traction. On a very soft fairway, a lower pressure prevents tires from cutting into fairways by affording more flotation. All tires should have the same pressure for optimum handling characteristics. Be careful not to overinflate. Due to the low volume of these small tires, over-inflation can occur in a matter of seconds. Be sure to replace the valve cap after checking or inflating.

### **BATTERY**

Check the electrolyte level frequently. Uncorrected evaporation losses can cause needless battery failure. If electrolyte is low, add water to bring level back up to just below the bottom of fill opening. Do not overfill as this will cause loss of acid and result in battery failure.

For additional battery Service instructions, see Battery Service under Electrical Section.

### **SEATS**

#### **Preparation of Seats for Service**

Remove protective plastic bags from seats before placing car in service. The main function of these plastic bags is to protect the seat bottoms and back rests during shipping. If plastic bag is left on the seats and gets torn dirt getting under the plastic bag is ground into the cover material. Water getting under the plastic bag is trapped and eventually soaked up by the plywood and cushions.

#### **Cleaning**

To clean seats, use a mild, non-abrasive detergent and water, or a foam vinyl cleaner/conditioner such as is used for cleaning vinyl tops on automobiles. **CAUTION!** Some vinyl cleaner/conditioners may harm painted surfaces. Therefore, it is recommended that seats be removed for cleaning if possible.

Using a sponge or soft bristle brush, clean a small area at a time and wipe with a clean rag. Repeat until entire seat is cleaned. After cleaning, rinse, dry, and apply a spray coating of Johnson's "Pledge" wax and wipe with a clean cloth.

#### **Grease, Oil or Other Stubborn Stains**

Use VM&P Naptha or **white** gasoline to remove grease, oil or other stubborn stains, then clean per **cleaning** instructions as previously outlined.

The use of general purpose cleaners such as "409", "Fantastik" or abrasive scouring powders should be avoided, as these type cleaners tend to destroy the protective coating on the vinyl material.

**GENERAL**

Two types of axle & brake assys were used on the E-Z-Go, 244cc gasoline golf cars.

Cars manufactured from February 23, 1976, to March 3, 1977, are equipped with a Dana Corp. type A-12 & D-12 axle and brake assy. This type assy is equipped with a flange hub, formed on the end of the axle shaft and a stamped metal brake drum. (See fig. 1-C for identification of this type unit.) (Repair procedures for A-12 & D-12 are identical and are listed as A-12 type.)

Cars manufactured from March 4, 1977, and subsequent, are equipped with a Dana Corp type S-12 axle and brake assy. This type assy is equipped with a cast iron hub-drum combination (See fig. 2-C for identification of this type unit).

**BRAKE ADJUSTMENT (A-12 type & S-12 type)**

1. Adjust the brake pedal stop to allow the pedal maximum travel in the up position without hitting the hill brake release cam. (See Fig. 3C) Adjust by bending stop bracket.
2. Remove wheels to expose opening in drum for adjusting tool and reinstall two lug nuts (opposite each other) finger tight to secure drum to hub. (See Fig. 1 C) (Not Necessary on S-12 type.)

**Note:** Check to make sure hill brake is not engaged before attempting to adjust brake shoes.

3. Adjust the brake shoes out to a locked position then back off 5 to 10 notches **or until the drum turns freely.**
4. Back off jam nuts at each end of turnbuckle body and adjust turnbuckle to obtain the proper tension on the **hill brake**. The hill brake must be set to hold when car is parked on an incline. (Test brake performance on the golf course before releasing car for use.) See Hill Brake adjustment p. C5.

**Note:** Very low pressure setting will cause the hill brake to release prematurely. Very high pressure setting will cause excessive and unnecessary wear on the latch mechanism.

5. **IMPORTANT!** After adjusting the turnbuckle to obtain proper hill brake tension, release the pedal and check for 1/16" inch minimum slack between cable head and inside of clevis (both cables). This is necessary to allow for "floating action" of rear axle. (See Fig. 3C)

**Note:** If further adjustment is required to obtain the 1/16" minimum, the pedal stop must be adjusted upward to allow the pedal more travel in the up (released) direction. (See Fig. 3C)

**BRAKE CABLE ASSEMBLY REMOVAL (Fig. 4C & 5C) (A-12 type & S-12 type)**

Remove cotter pin and clevis pin (1), remove retainer clip (2.) (Fig. 4C)

Remove cotter pin and clevis pin (1), remove retainer clip (2), Fig. 5 C), remove cable support clamp (3), (Fig. 4 C), and remove cable from frame brackets.

Install cable or cables in reverse order and adjust per adjustment procedure.

**BRAKE DRUM AND SHOE REMOVAL (A-12 type)**

Remove wheel and remove two drum retainer clips (Fig. 6-C) to remove drum.

## Section C

### BRAKE DRUM AND SHOE REMOVAL (A-12 Type Continued)

#### Drum Inspection

Whenever brake drums are removed they should be thoroughly cleaned and inspected for scores, deep grooves, and out-of-roundness. Any of these conditions must be corrected since they can impair the efficiency of brake operation and also can cause premature failure of other parts.

Smooth up slight scores by polishing with fine emery cloth. A heavy or extensively scored drum will cause excessive brake lining wear and should be replaced with a new drum. **Do not** rebore in order to true up the braking surface.

An out-of-round drum makes accurate brake shoe adjustment impossible due to its eccentric action. A drum that is more than .010 inch out-of-round on the inside diameter should be replaced with a new drum.

#### Cleaning

It is recommended that a suitable greaseless type solvent be used to clean the braking surface of brake drums before they are placed in service to insure the cleanest possible surface.

Gasoline or Kerosene should not be used as there is danger that a portion of the diluted oily substance may be left on the braking surface.

#### Shoe Removal (Fig. 7C)

Remove adjusting screw spring and adjusting screw at top of brake assembly.

Remove retainer pins (1) and remove shoe actuating lever assembly.

Remove shoe return springs (2) and remove shoes. (**Note:** Always install short shoe to rear of car.)

If the torque spider (brake mounting plate) or dust shield must be removed, Remove four backing plate nuts (4) which hold the torque spider to the housing using  $\frac{1}{2}$ " socket. (An opening in the wheel mounting flange permits access for socket).

When brake is reassembled torque four mounting nuts to 23-35 Ft. lbs.

Reassemble brake in reverse order, install new retainer pins (1) as shown, adjust brakes, install wheels and test drive to check brakes before putting car back in service.

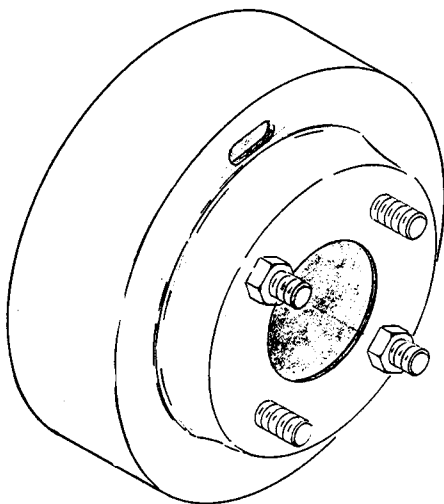


FIG. 1 C

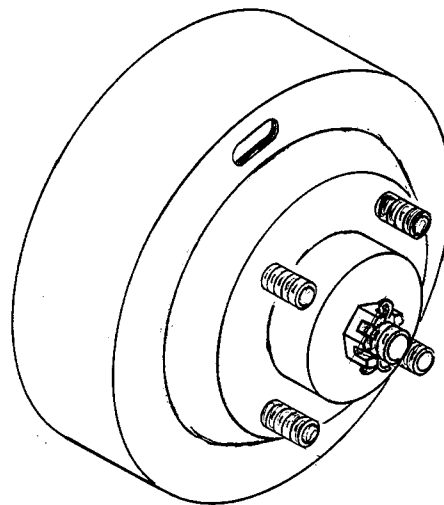


FIG. 2 C

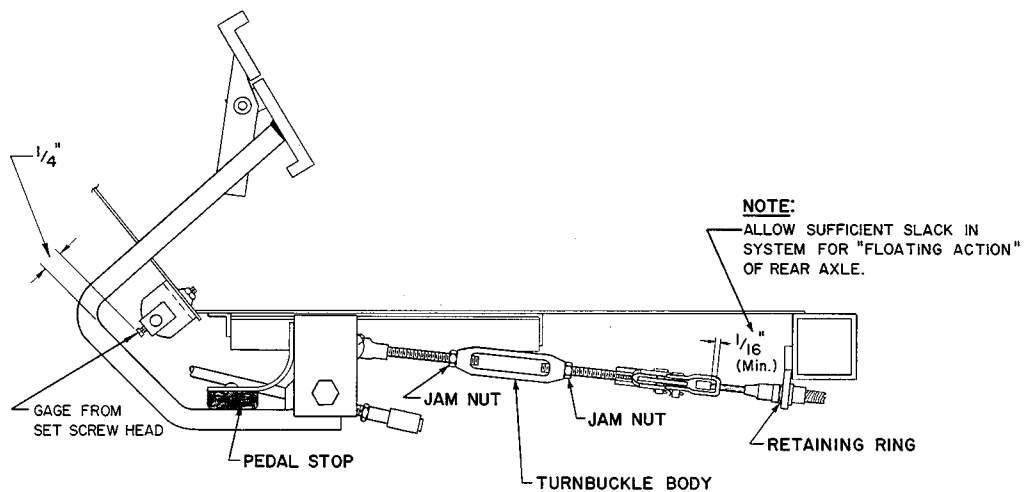


FIG. 3C

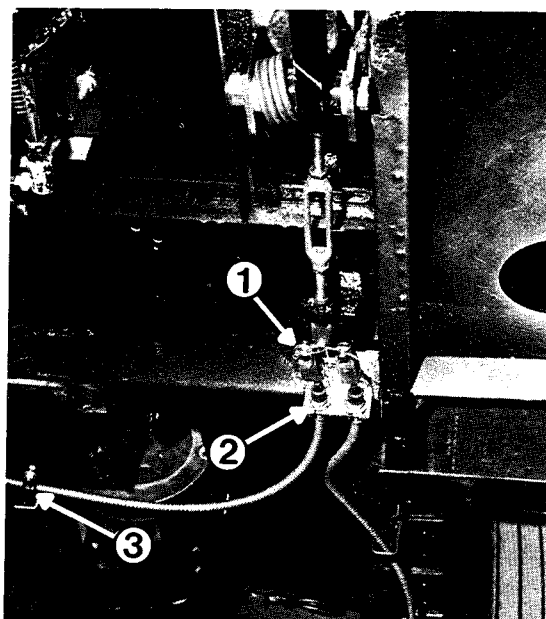


FIG. 4C

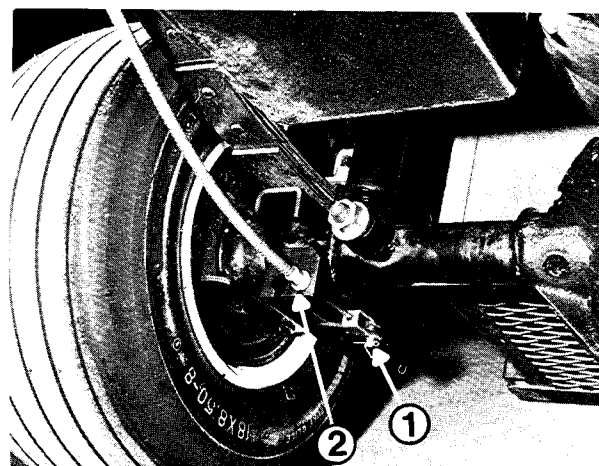


FIG. 5C

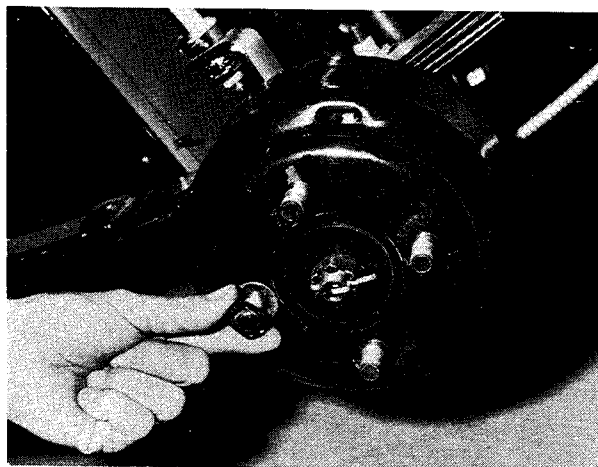


FIG. 6

## Section C

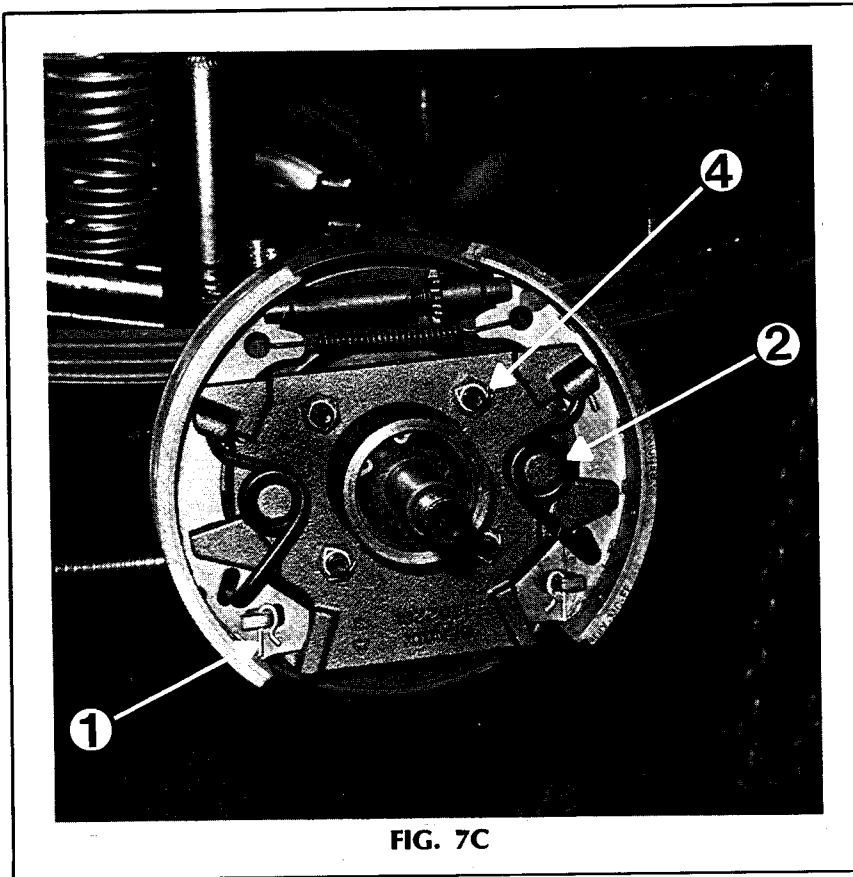


FIG. 7C

### BRAKE DRUM & SHOE REMOVAL S-12 TYPE

Remove wheel, remove lock nut or cotter pin and slotted nut, and remove hub-drum assy.

#### Drum Inspection

Whenever brake drums are removed they should be thoroughly cleaned and inspected for scores, deep grooves, and out-of-roundness. Any of these conditions must be corrected since they can impair the efficiency of brake operation and also can cause premature failure of other parts.

Smooth up slight scores by polishing with fine emery cloth. A heavy or extensively scored drum will cause excessive brake lining wear and should be replaced with a new drum. **Do not** rebore in order to true up the braking surface.

An out-of-round drum makes accurate brake shoe adjustment impossible due to its eccentric action. A drum that is more than .010 inch out-of-round on the inside diameter should be replaced with a new drum.

#### Cleaning

It is recommended that a suitable greaseless type solvent be used to clean the braking surface of brake drums before they are placed in service to insure the cleanest possible surface.

Gasoline or Kerosene should not be used as there is danger that a portion of the diluted oily substance may be left on the braking surface.

#### Shoe Removal

Brake Shoe Removal (Fig. 7C)

Remove adjusting screw spring and adjusting screw at top of brake assembly.

Remove retainer pins (1) and remove shoe actuating level assembly.

Remove shoe return springs (2) and remove shoes.

If the torque spider (brake mounting plate) or dust shield must be removed, Remove 4 Nuts using a 1/2" Socket. When brake is reassembled torque four mounting nuts to 23-35 Ft. lbs.

Reassemble brake in reverse order, install new retainer pins (1) as shown, adjust brakes, install wheels and test drive to check brakes before putting car back in service.

When reinstalling brake drum, torque slotted nut to 70 ft. lbs., then increase to nearest slot.



**HILL BRAKE ADJUSTMENT** (See Fig. 8 C)

Before adjusting the hill brake, the service brake must be correctly adjusted and operating properly. Refer to Brake Adjustment.

If the Hill Brake fails to lock when the pedal (18) is depressed or will not release when the accelerator pedal is depressed, adjust as required using the following procedure.

If the lock arm (1) will not engage the catch bracket (5) or if the hill brake will not automatically release, loosen the two nuts (17) and bolts (11) securing bracket (16) and move bracket down as required to achieve full engagement of lock arm notch, then readjust cam (6) as follows:

With the pedal depressed and locked down, loosen two set screws (7) securing cam (6) to shaft (8) and rotate cam (6) until flush against lock arm (1).

**REMOVAL OF HILL BRAKE RELEASE LINKAGE** (See Fig. 8 C)

To remove the hill brake release linkage, hoist the front of car to allow access to underside.

To remove the linkage rod (15), disconnect the two ball joints (13) by sliding barrel part of joint away from the ball stud.

Loosen two set screws (7) in cam and slide cam off, then slide level arm shaft (8) out of pivot bracket.

Loosen two nuts (17) and bolts (11) and remove pivot bracket (16). If the flanged bearings (9) are worn, replace with new bearings.

Reassemble by reverse procedure.

**DISASSEMBLY OF BRAKE PEDAL** (See Fig. 9 C)

To repair or replace damaged or worn brake pedal parts, disassemble as follows:

Unhook the pedal return spring (14), (Insert a thin blade screw driver between small hook end and pedal bracket, force spring back and away from bracket.)

Remove lock nut (12) from pivot bolt (11) and remove bolt. Remove spring, disconnect cable clevis and lift pedal out through floorboard.

To remove hill brake pedal, make note of how the two springs (2) are positioned. Remove pushon retainer nut (1) (new nut required for reassembly) and remove hinge pin (6).

Pedal pad replacement will require a special adhesive, refer to your E-Z-GO parts manual. Reassemble and install in reverse order of disassembly.

**SEAT BRAKE ADJUSTMENT** (See Fig. 10 C)

The seat brake is designed to hold the car in position when parked on an incline, without assistance from the foot brake. To adjust or disassemble for repair or replacement of worn parts, use the following procedure:

Depress release level (21) and lock down with lock out hook (11). Run stop nut (7) up against bracket. Disengage hook (11), and swing level (21) back to gain access to pin (6).

Loosen cable jam nut (14). Use adjusting tool (26), turn pin (6) to adjust out excess slack between clevis and cable swedge, while holding cable to prevent windup. (Maintain  $\frac{1}{8}$ " dimension). Retighten jam nut (14) and back off stop nut (7) to end of threads on pin (6).

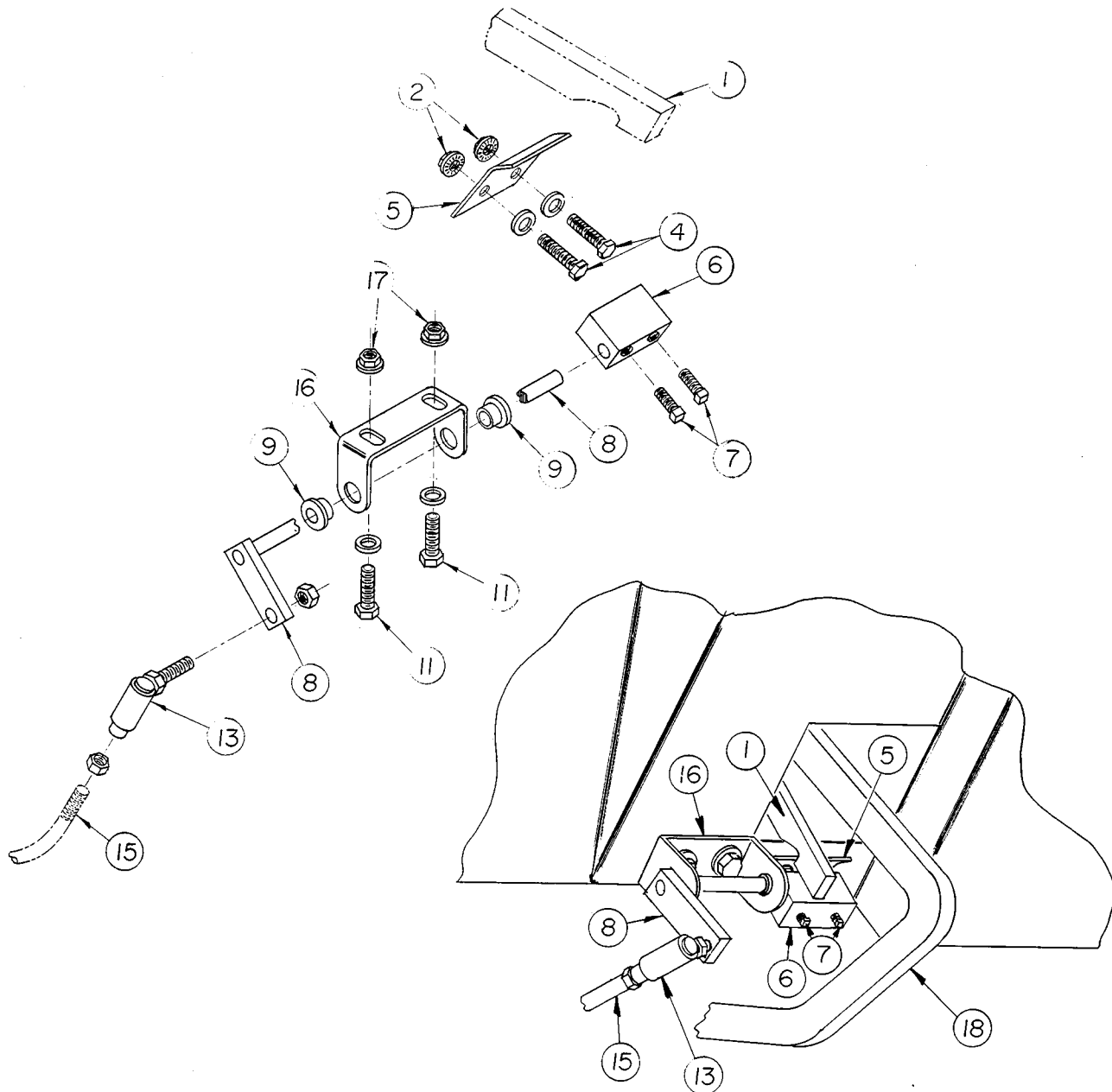


FIG. 8 C HILL BRAKE LINKAGE

### DISASSEMBLY OF SEAT BRAKE

#### Cable Removal: (See Fig. 10 C)

Depress the release lever (21) and lock down with lock out hook (11), remove cotter pin (23) and clevis pin (25) from cable clevis. Remove retainer ring (24) and loosen set screw (15) and disconnect cable from level on rear wheel.

#### Spring Guide Pin and Bushing Removal: (See Fig. 10 C)

Loosen jam nut (14) on cable (13), back-off stop nut (7). Use adjusting tool (26) to turn guide pin (6) in counter-clockwise direction until the cable threads out of pin. Remove pin and spring (5), push bushing (4) out by pushing up from bottom.

Reassemble in reverse order or disassembly.

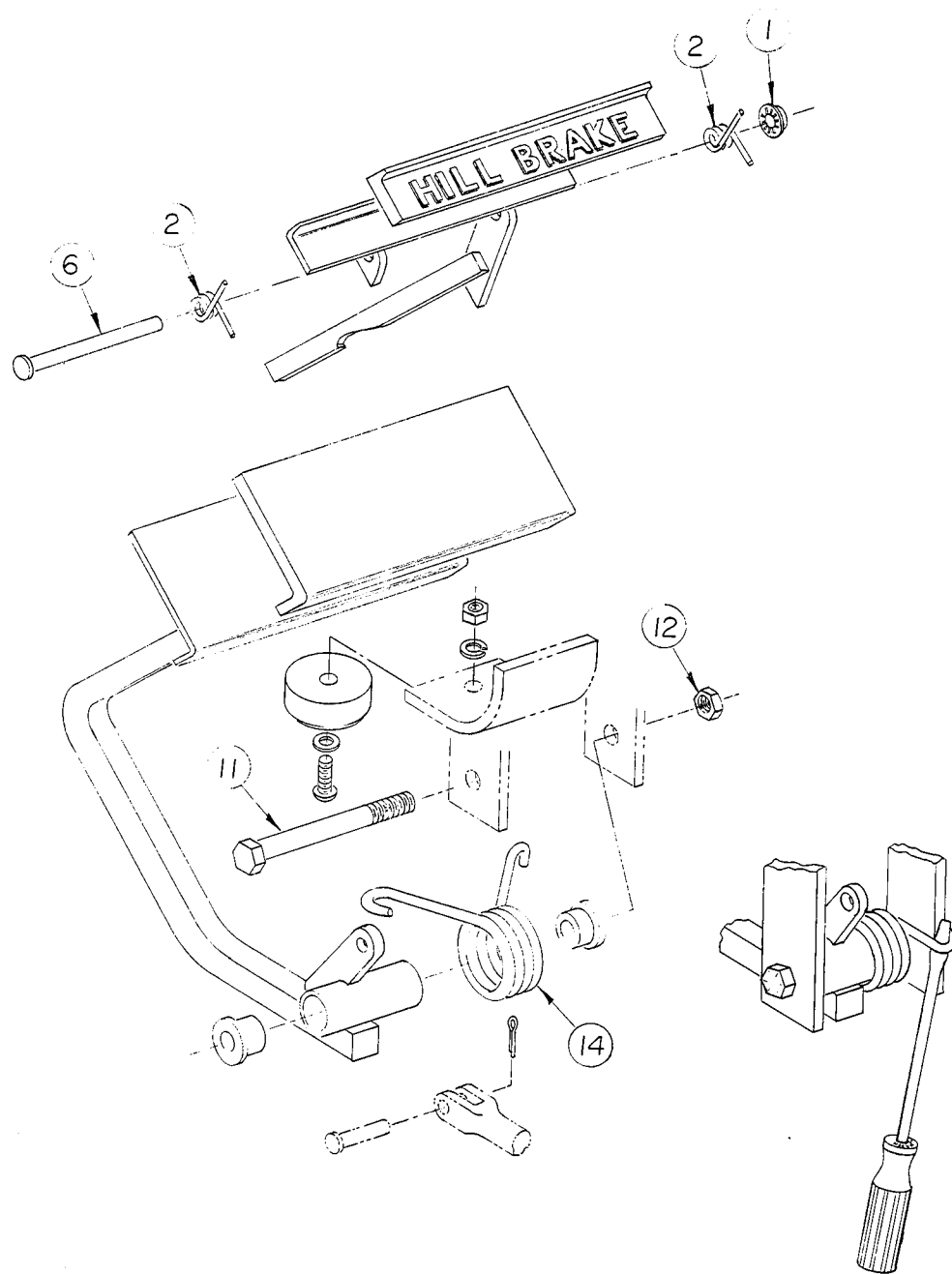


FIG. 9 C DISASSEMBLY OF BRAKE PEDAL

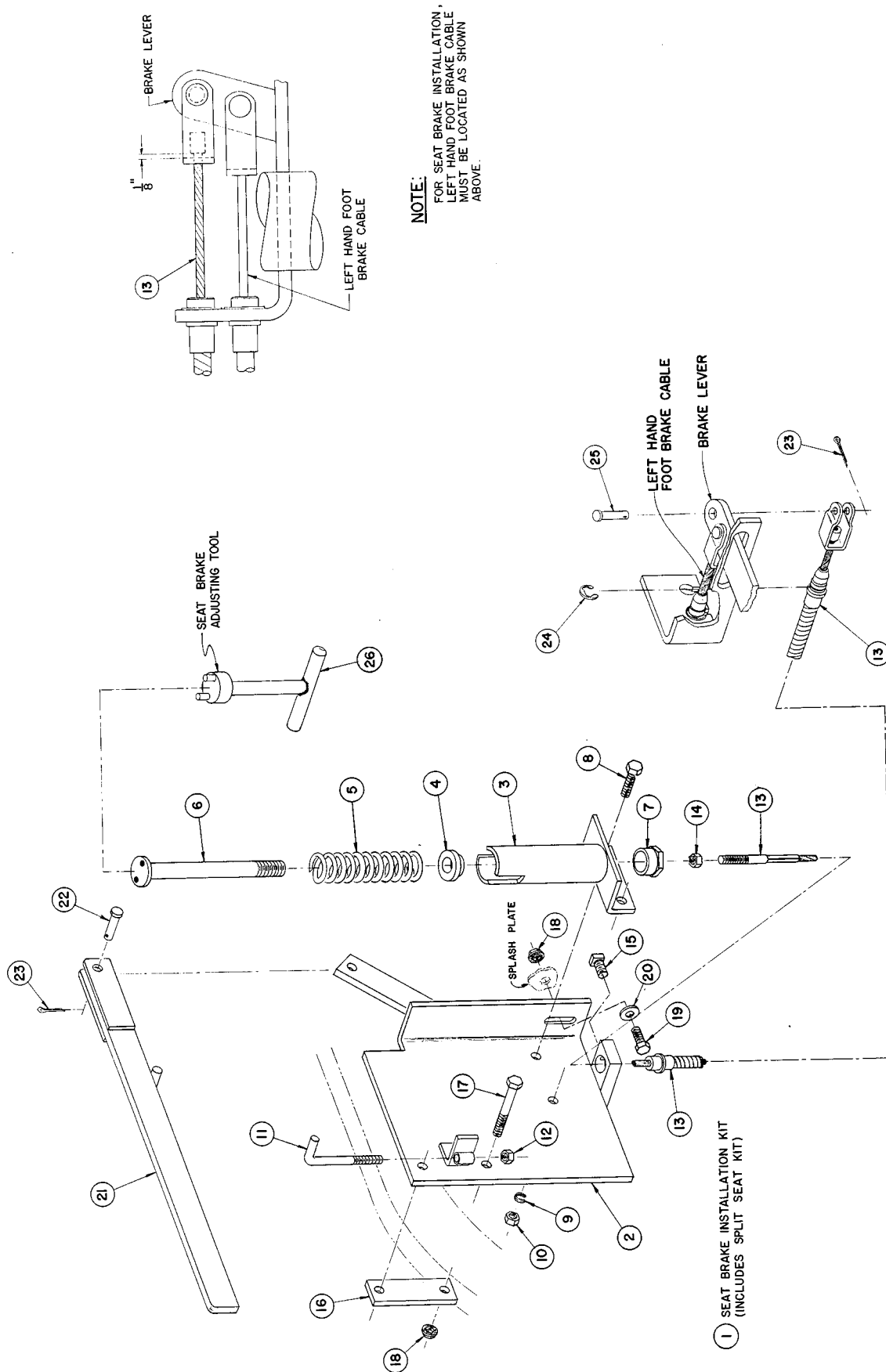


FIG. 10 C

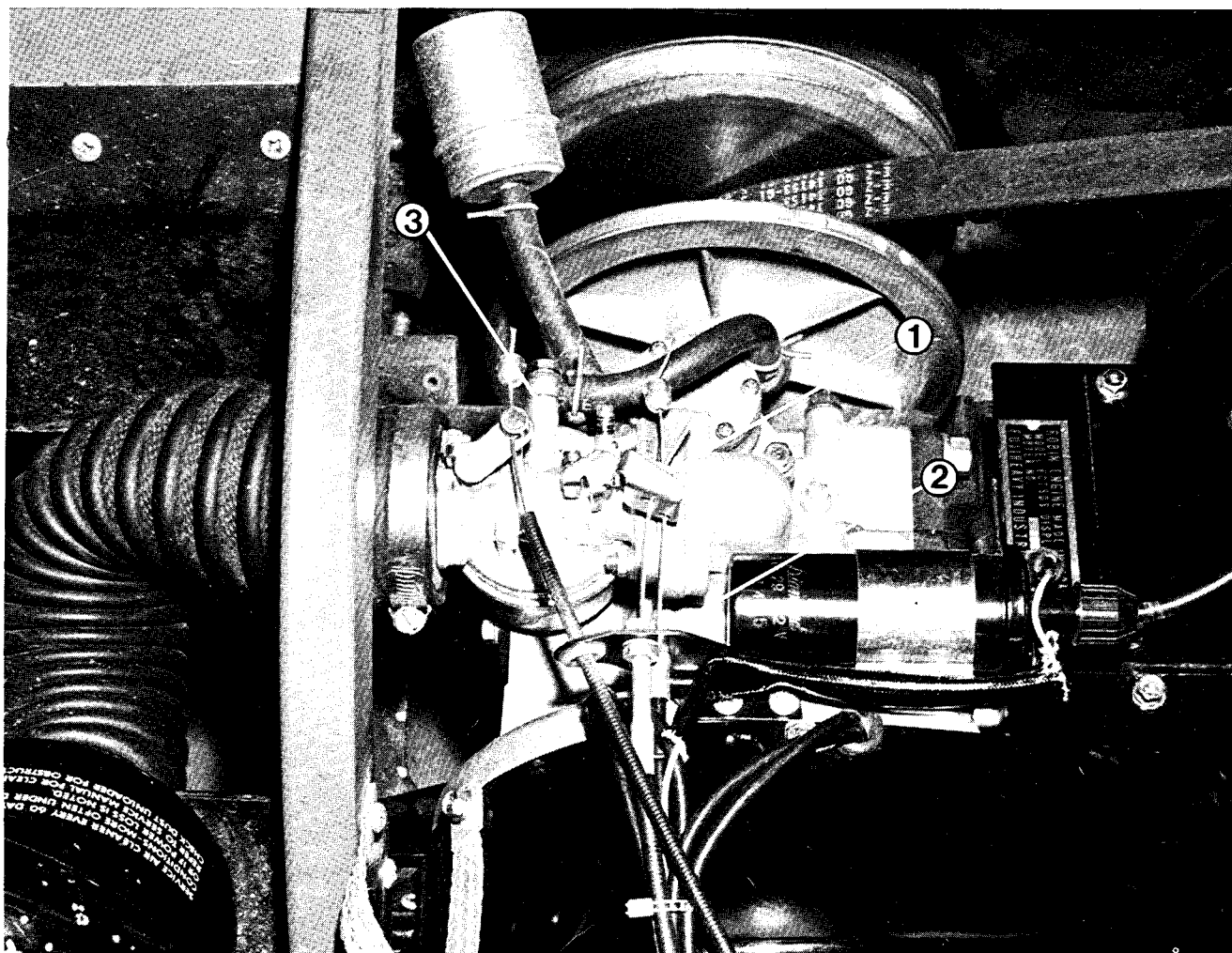
**ACCELERATOR CONTROL CABLE**

To remove accelerator cable and housing assembly, proceed as follows: (Fig. 1 D and 2 D)

Loosen set screw and remove cable clamp (1) at carburetor throttle lever. Remove cable housing nut (2). Slide the barrel of the ball joint back and disconnect cable assembly from pedal arm. Remove assembly from housing bracket (under floorboard) by squeezing plastic tabs closed and pull out toward rear of car (See Fig. 2 D). It may be necessary to cut and replace the nylon clamps securing the cable housings together in engine compartment.

Lubricate cable liberally with a graphite grease before installing. If cable does not slide freely, remove housing and flush out with solvent. Allow to dry before reinstalling.

Reinstall cable and cable housing in reverse order of disassembly. Adjust per Accelerator Adjustment Procedure.



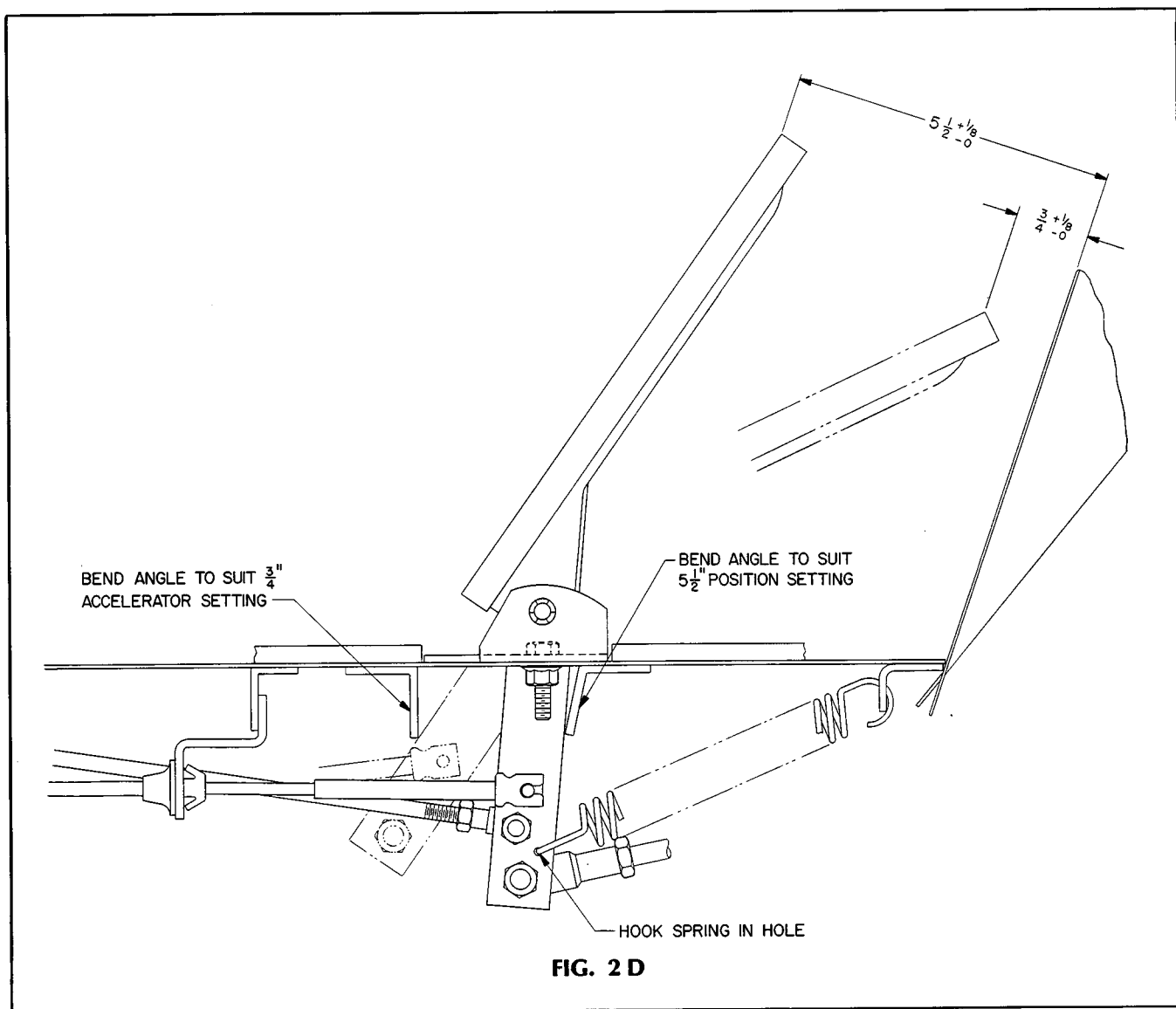
**FIG. 1 D CARBURETOR CONTROLS**

## Section D

### ACCELERATOR ADJUSTMENT (Fig. 2 D)

Check pedal position for correct setting of stops. With pedal in full released or up position, the dimensions from top of pedal to dash scuff plate should be  $5\frac{1}{2}$  inches. With pedal fully depressed, dimension should be  $\frac{3}{4}$  inch. Bend the angle stops under floorboard as necessary to achieve these dimensions.

After adjusting pedal travel, adjust the cable as follows: (See Fig. 1 D) With pedal in released position, loosen set screw in cable clamp (1) behind carburetor throttle lever, pull excess cable through clamp and lever, slide clamp against lever and tighten set screw. **CAUTION!** When making this adjustment, care must be taken not to pull cable clamp against throttle lever tight enough to cause binding of the throttle plate, however, throttle plate must close completely or backfire can occur. Set idle screw (3) against lever to prevent binding of throttle plate. Check cable to make sure it slides freely in housing.

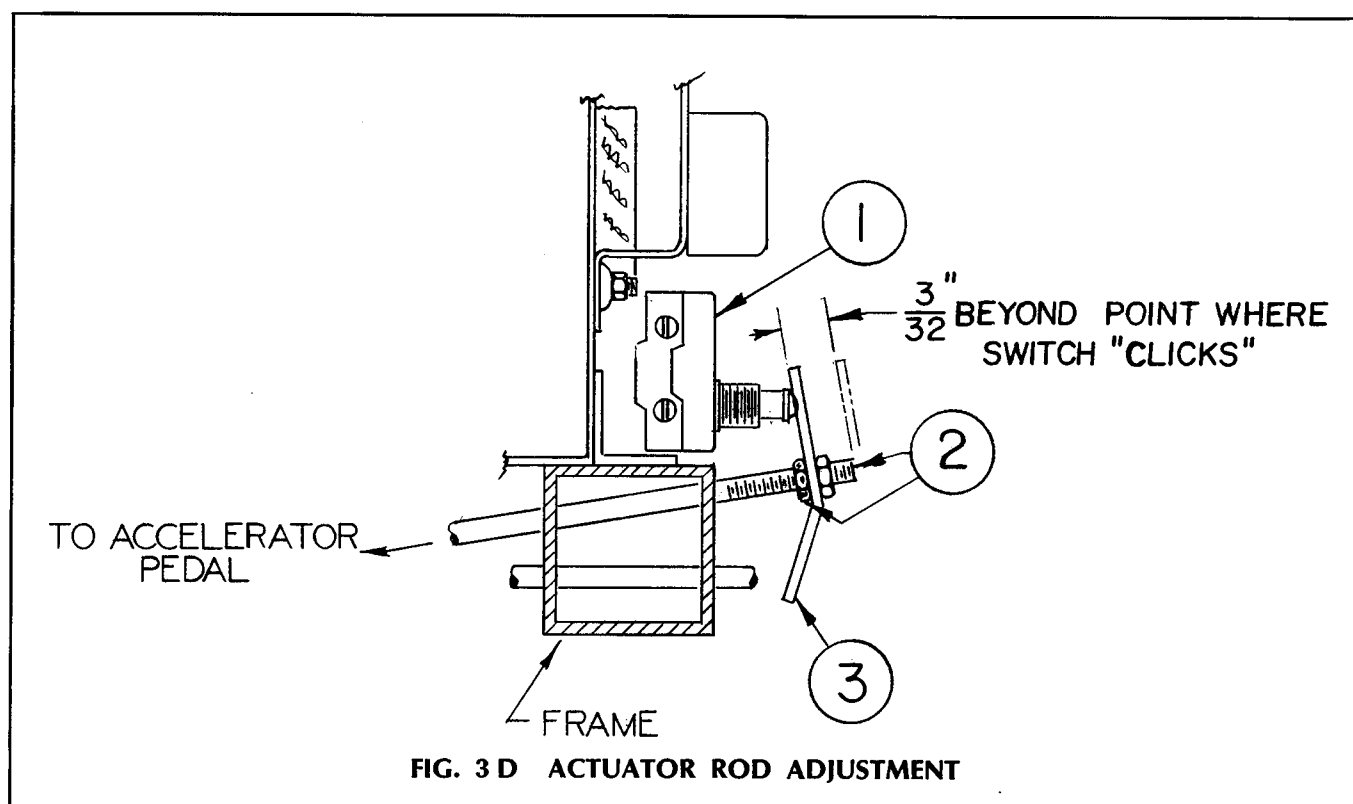


## ACTUATOR ROD

The controls are equipped with a Micro Switch (located below control panel in engine compartment) which serves as an electrical cutout when the accelerator pedal is released. The switch is operated by a metal disc mounted on an actuator rod connected to the accelerator pedal. To assure proper operation and to prevent damage to the Micro Switch, the disc must be adjusted when accelerator pedal and linkage adjustments are made.

### Adjustment (Fig. 3 D)

Loosen the jam nuts (2) and move disc (3) in, depressing Micro Switch (1) plunger until switch "clicks". Continue moving disc in beyond the click point for  $\frac{3}{32}$  inch. Tighten nuts to secure disc. **CAUTION!** More than  $\frac{3}{32}$  inch overtravel will damage the switch. Operate accelerator pedal by hand to check for smooth operation of rod through frame crossmember.



### Actuator Rod Removal:

Remove the outside jam nut securing disc in place, slide disc off and remove front jam nut. Disconnect rod from accelerator pedal arm by sliding the barrel of ball joint to rear and pull joint off ball stud or remove cotter pin and flatwasher, depending on model. Slide the rod out toward front of car.

Reassemble by reverse procedure and adjust as shown in adjustment procedure. (Fig. 3 D)

## Section D

### CHOKE CONTROL

#### Cable and Housing Removal: (Fig. 1 D)

Loosen set screw and remove cable clamp from cable and slide cable out of swivel. Remove nut securing housing to panel and pull out toward front of car. Reinstall by reverse procedure. Make sure there is no sharp bend in cable housing.

NOTE: On Models with BV-18 (small carburetor), it is necessary to remove nut from cable housing at carburetor.

Insert cable through swivel, make sure choke knob is pushed fully in and carburetor choke lever is in the full open position. Pull excess cable through swivel and reinstall cable clamp ½ inch behind swivel.

#### GOVERNOR CONTROL (Fig. 4 D)

Governor control lever and cable must work freely, or car will not operate smoothly through speed range. With engine stopped, check governor cable for free movement in throttle lever and for free movement of cable in housing. Check governor lever for free rotation on pivot bolt. Check chrome button on governor lever and plastic follower button on driven clutch dust cover for excessive wear. If worn replace with new parts.

#### Governor Cable Removal:

Loosen set screw in cable clamp at carburetor and remove clamp from cable. Loosen set screw in swivel on governor lever. Remove housing nuts at both ends of cable housing. Slide housing through plastic ties to remove. It may be necessary to cut plastic ties and replace during reinstallation. **CAUTION!** When reinstalling cable, care must be used to route cable so it will not contact the exhaust pipe or muffler.

#### Governor Lever Removal:

Remove cable (See above). Remove nut and washer and slide lever and spring of pivot bolt. Inspect bushings for wear and replace if necessary. Reassemble governor lever, spring and cable by reverse procedure. Center lever button with clutch cover button as shown. Care must be taken during reassembly to allow governor lever to pivot freely, but with a minimum of side play.

#### Governor Adjustment:

Recommended maximum governed speed is approximately 12 miles per hour which is 100 yards in 17 seconds or 352 yards per minute.

The governor is set at the factory for approximately 12 MPH. If adjustment is required, loosen the set screw in cable clamp and slide cable clamp to maintain 1¼" from carburetor throttle lever when lever is fully closed. After adjusting clamp to 1¼" dimension, tighten set screw.

NOTE: On Models with BV-18 (small carburetor), set cable clamp 1 7/16" from carburetor throttle level when lever is fully closed.



GOVERNOR LEVER

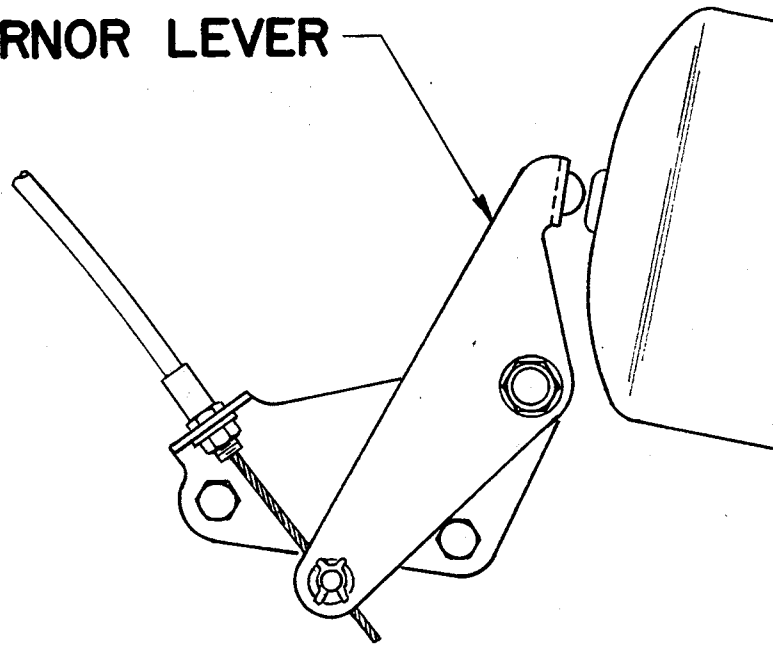


FIG. 4 D GOVERNOR CONTROL



**STEERING**

The steering assembly is a rack and pinion type. There is no method of adjustment in this type gear box. If the steering has excessive play or backlash, it may be necessary to replace worn gears or ball joint on end of rack.

**STEERING ASSEMBLY REMOVAL (Fig. 1 E)**

Turn the steering wheel to the right to place rack end ball joint (48) in an accessible position. NOTE: On four wheel cars, it is necessary to remove four nuts securing the front shield and remove to give access to the steering arm area. Remove cotter pin (8) from slotted nut (9) and back nut off approximately half way or until threads are covered. Using a drag link tool as a lever, apply pressure to ball joint and tap nut with a hammer to loosen ball stud. Remove nut and lift stud from arm. Remove three bolts (32) securing gear box to floorboard. Remove "U" bolt (43) securing column (29) to bracket and lift assembly out of car.

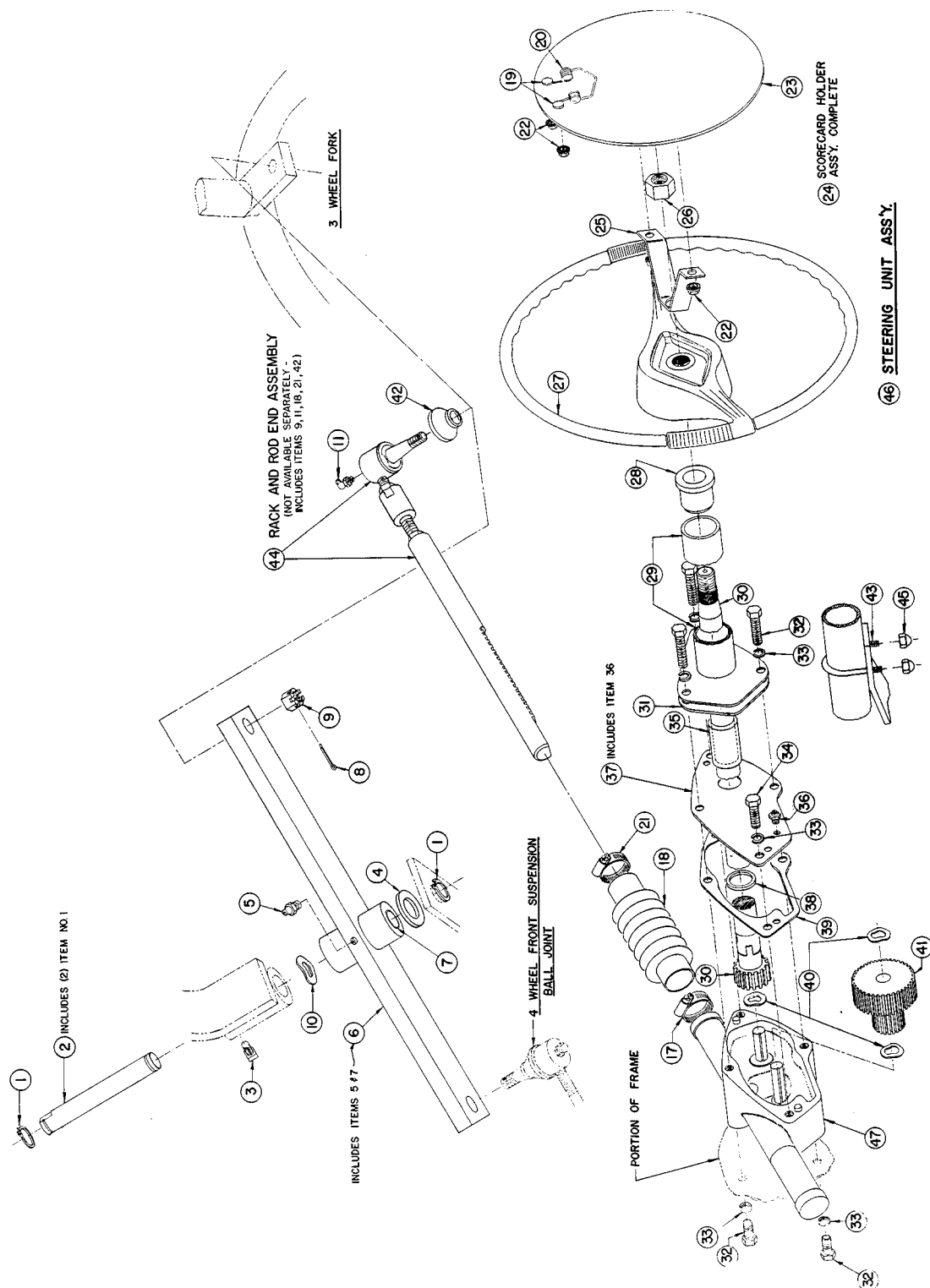
Reinstall in reverse order of removal. Torque ball stud slotted nut (9) to 40 Ft lbs. Install new cotter pin.

**DISASSEMBLY****Steering Wheel Removal:**

Remove two nuts (22) securing score card disc (23) and remove disc. Back shaft nut (26) off approximately two turns. Do not completely remove nut, so that column threads will not be damaged by puller. Install a bearing adapter on column under wheel hub. Use a two jaw puller and install with jaws hooked under bearing adapter. Tighten puller screw to apply pressure on wheel and against shaft. Strike top of puller screw with a hammer to break wheel loose. Remove nut, score card bracket (25) and wheel. If a puller is not available, it is possible to remove the wheel as follows: Remove score card disc and back nut off as described above. Remove "U" bolt (43) securing column to bracket. Remove three bolts (32) securing column flange to gear box and lift column and steering wheel out of car. Support wheel hub between two wood blocks or vice jaws. Place a metal block or bar on shaft nut and strike with a hammer to break wheel loose.

**Removal and Replacement of Column Bushing:**

Remove steering wheel (Refer to Steering Wheel Removal Procedure). Pull bushing (28) out, press in new bushing.



**FIG. 1 E STEERING UNIT DISASSEMBLY**

**Steering Shaft Removal:**

Remove column and wheel. (Refer to Steering Wheel Removal Procedure). Slide shaft (30) out through flanged end.

**Gear, Rack and Ball Joint Removal:**

Remove four bolts (32) securing column and cover plate to housing, remove "U" bolt (43) remove column and cover plate. When removing gears make note of the spring washer (40) positions. One under the pinion (30) and one on top and bottom of the reduction gear (41). Be sure washer are properly positioned when reassembling gears.

Loosen two clamps (17) securing the bellows (18), slide rack (16) out and remove bellows. Remove rack and rod end assembly. If ball joint or tie ends are worn, or if either has excessive play, the rack and rod end assembly must be replaced as a complete assembly. Individual parts are not available.

Clean all parts with solvent and check for wear. Replace worn or damaged parts with new parts. Repack gear box with good grade gear grease. (The factory recommends Chevron Moly Grease - 2). Smear grease liberally on gear studs, rack and gears before reassembly.

Reassemble all parts in reverse order of disassembly. Be sure all assembly bolts and nuts are tightened securely.

**Idler Arm Removal (4 Wheel Cars)**

Disconnect the steering gear rack ball joint (48) and drag link ball joint using procedure described in Steering Assembly Removal. Remove two snap rings (1) from shaft (2). Remove set screw at top end. The shaft also has wrench flats at top end to aid in removing. When reassembling arm (6), be sure the long end is toward floorboard and large end of tapered hole is on top side. Torque slotted nuts (9) to 40 Ft. lbs. and install new cotter pins.

## Section E

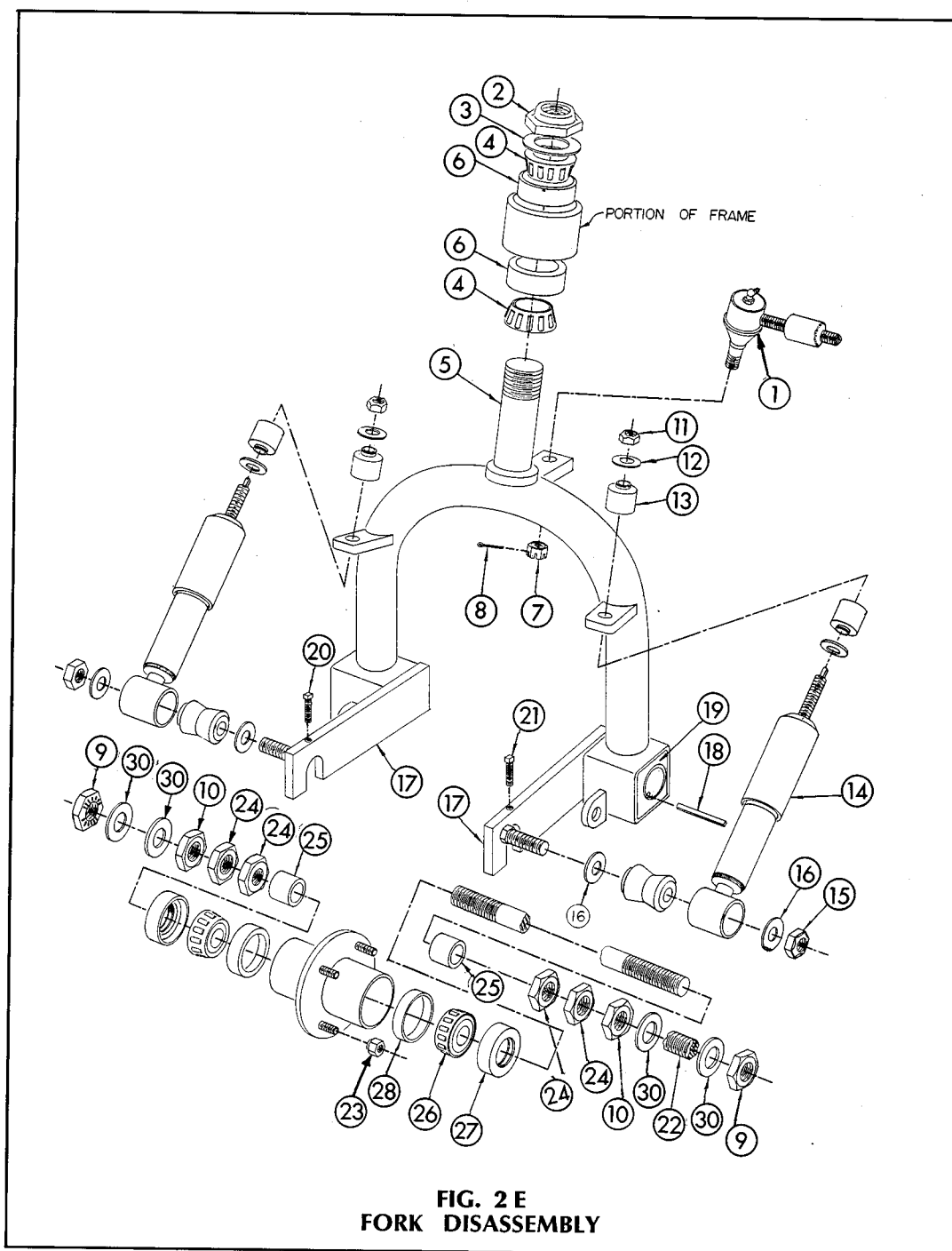
### **FORK** (3 Wheel Cars)

#### **Fork Removal and Bearing Service:** (Fig. 2 E)

Lift front of car and place on jack stands or blocks. Disconnect steering rack ball joints (1). (Refer to Steering Assembly Removal.) Remove cowl center support to give access to fork stem nut (2). Lift dash mat and remove fork cap. Remove nut and washer (3) from stem. **NOTE:** While removing nut support fork so that it will not drop out and damage threads or bearings. The bottom bearing (4) will remain on fork stem (5). To remove tap lightly on bottom surface to break loose, then bearing should slide off. **NOTE:** The grease seal is an integral part of bearing. If seal is damaged, bearing should be replaced.

Clean bearings with solvent and check for damage or excessive wear. Replace with new parts if necessary. Repack bearings with wheel bearing grease, making sure rollers are completely covered with grease down between rollers and inner race.

Inspect outer race (6) (in frame) for pitting or damage. If necessary remove and replace as follows: The lower race can be removed with a slide hammer puller. To remove the top race, use a long tapered drift punch. Insert punch through bottom end of housing and against lower edge of race. Strike punch with a hammer while alternately changing punch position around edge of race. Install new race by tapping lightly with a brass bar and hammer. Install bearing on fork (wide side down) and install fork by reverse procedure. Torque ball stud nut (7) to 40 Ft lbs. Install new cotter pin (8). Torque fork stem nut (2) down until fork is tight in frame. Then back nut off 1/4 turn or until fork will turn freely. Reinstall cap and cowl center support.



**FIG. 2 E**  
**FORK DISASSEMBLY**

**Fork Disassembly and Parts Replacement:** (Fig. 2 E)

Remove fork from car (Refer to Fork Removal). Loosen nut (9) on outside of fork arm, both ends of axle. Loosen nut (10) on inside, both ends. Remove axle and wheel assembly. Remove nut (11), washer (12), and rubber grommet (13) from top of shocks (14). Remove nut (15) and washer (16) from shock mounting studs on fork arms (17). Collapse shocks to remove from top bracket and remove from mounting studs. Any further disassembly will require a hydraulic press. Fork arms can be pressed out with a light duty shop press. When reassembling, align key ways and press in until arm bottoms against torsion block. Press or drive key (18) in until flush with outside. Removal or replacement of torsion blocks (19) will require a press with a capacity of 4,000 lbs. (2 tons) or higher. When pressing in new blocks, be sure key way is positioned to the front lower corner of housing (See Fig. 2 E). Apply rubber lube to outside of block and press in until centered with housing. (The factory recommends P-80 Rubber Lubricant manufactured by International Products, Trenton, N. J.)

## Section E

### Front Wheel Bearings: (3 Wheel Cars) Fig. 2 E

Lift front of car so that wheel is off the floor and block in place. Remove lock nuts (9) from ends of axle (22). Loosen jam nuts (10) to allow axle and wheel to drop out. Remove lug nuts (23) and remove wheel. Remove jam nuts (24) and (10) from one side only, remove spacer (25) and slide axle out. To remove grease seal and bearing, insert a drift punch through from opposite sides and lightly tap around the bearing cone (26). Clean bearings, seals and hub with a solvent and inspect for wear and damage. If bearing cups (28) are damaged or worn, drift out and press in new cups. Repack bearings with wheel bearing grease making sure grease is forced down between rollers and race.

To reassemble bearings, insert bearing into hub, place seal (27) into hub with flanged side to the inside, tap or press seal lightly around outer edge until flush with hub tube. Repeat for opposite side. Slide axle through bearings, install spacer (25) and jam nuts (24). (Tighten nuts only finger tight.) Mount wheel assembly and torque lugs to 50-60 Ft. lbs. Install nut (10), washers (30) and nut (9), place wheel and axle in slots on fork arms (17) making sure washers (30) are placed one on each side of arm. Tighten jam nuts (10) against arm and torque lock nuts (9) to 90-100 Ft. lbs. Spin wheel and tighten nut against spacer until wheel becomes hard to turn, back nut off to allow wheel to turn freely. Lock in place with second nut (24).

### FRONT WHEEL ALIGNMENT

#### Three Wheel Car:

Determine the need for wheel alignment by driving across a level area. If the steering tends to pull to one side, align wheel as follows: Position car on flat level surface and set wheel in straight position. Loosen nut (9) and nut (10), both ends of axle (Refer to Fig. 2 E).

Using a carpenters square or by sight, check the vertical position of wheel. If top of wheel leans to the right, adjust set screw (20) on fork arm down until wheel is vertical (90° to floor). If wheel leans to left, adjust set screw (21) on fork arm until wheel is vertical. Retighten jam nut and torque lock nut on axle ends to 90-100 Ft. lbs. **CAUTION!** Limit adjustment so that full axle diameter remains in fork arm slot.

#### Four Wheel Car: (Fig. 3 E and 4 E)

The front wheel alignment is set at the factory to have zero camber (90° to floor line) and zero to 1/4 inch total toe-in. This setting will give best steering and minimize tire wear. If adjustment is required, position car on a flat level surface, set wheels straight ahead, and proceed as follows:

#### Camber Adjustment: (Fig. 3 E)

Check the camber setting of each wheel with a carpenters square as indicated by Fig. 3 E. (For a more accurate method of checking camber use an automotive type Caster-Camber gage.) If camber is not zero, loosen nut (1) and bearing nut (2) at two adjustment cam connections of upper support arm. **NOTE:** Loosen bearing nut (2) only as required to allow cam to move. Insert a heavy screw driver or thin point drift punch into cam slot and tap with a hammer to rotate cam. Rotate cam inboard to move top of wheel out, outboard to move top of wheel in. Retighten nut (2) and torque to 35-40 Ft. lbs., tighten nut (1). Repeat procedure for other wheel.



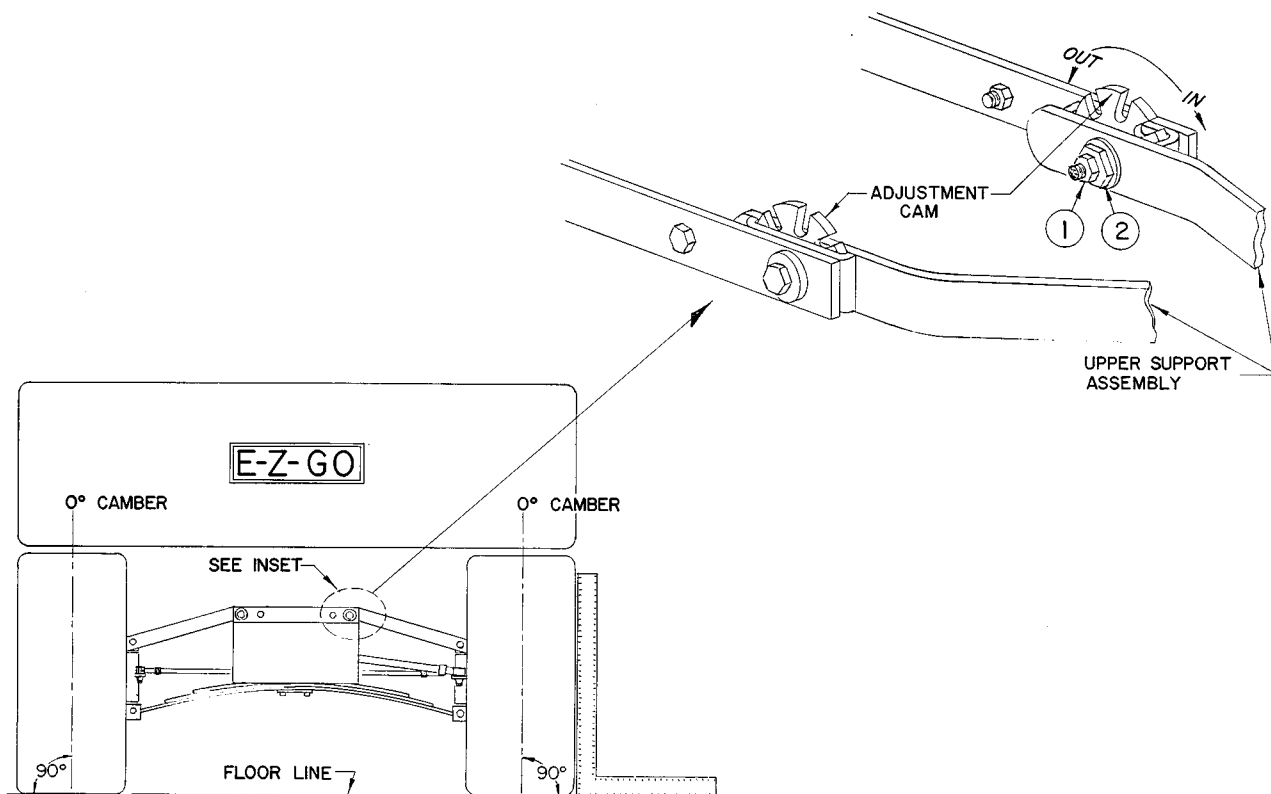


FIG. 3 E CAMBER ADJUSTMENT

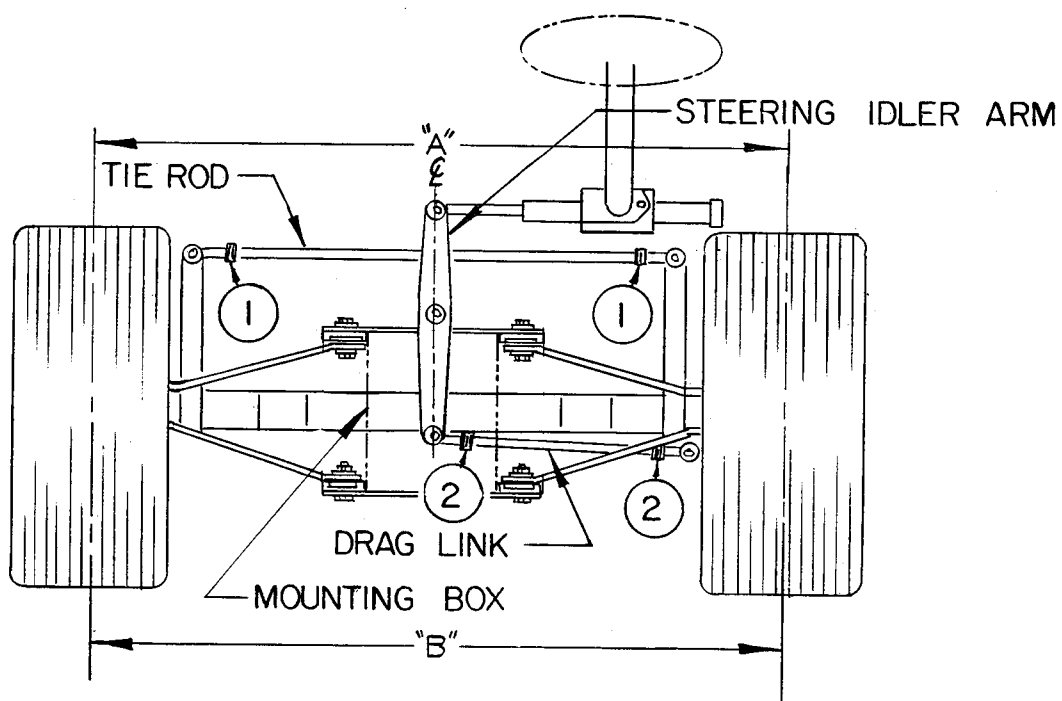


FIG. 4 E

## Section E

### Turning Radius Adjustment: (See Fig. 4 E)

To adjust steering to obtain equal turning radius to right and left proceed as follows: Set front wheels in straight ahead position. Measure from center line of steering idler arm to each side of mounting box. If this measurement is not the same for both sides, the drag link must be adjusted. Loosen clamps (2) on drag link and adjust by turning link center section as required to center idler arm. Be sure wheels remain in straight ahead position. Retighten clamps.

After adjusting drag link the steering stops must be reset to avoid damage to gear box. Steering stop bolts are mounted on the frame and strike against the idler arm. For adjusting, loosen jam nut and adjust bolt in or out as required and set so that idler arm stops an equal distance from center to either side of mounting box. **IMPORTANT!** Be sure stops are set so that steering rack does not reach maximum travel.

### Toe-In Adjustment: (Fig. 4 E.01)

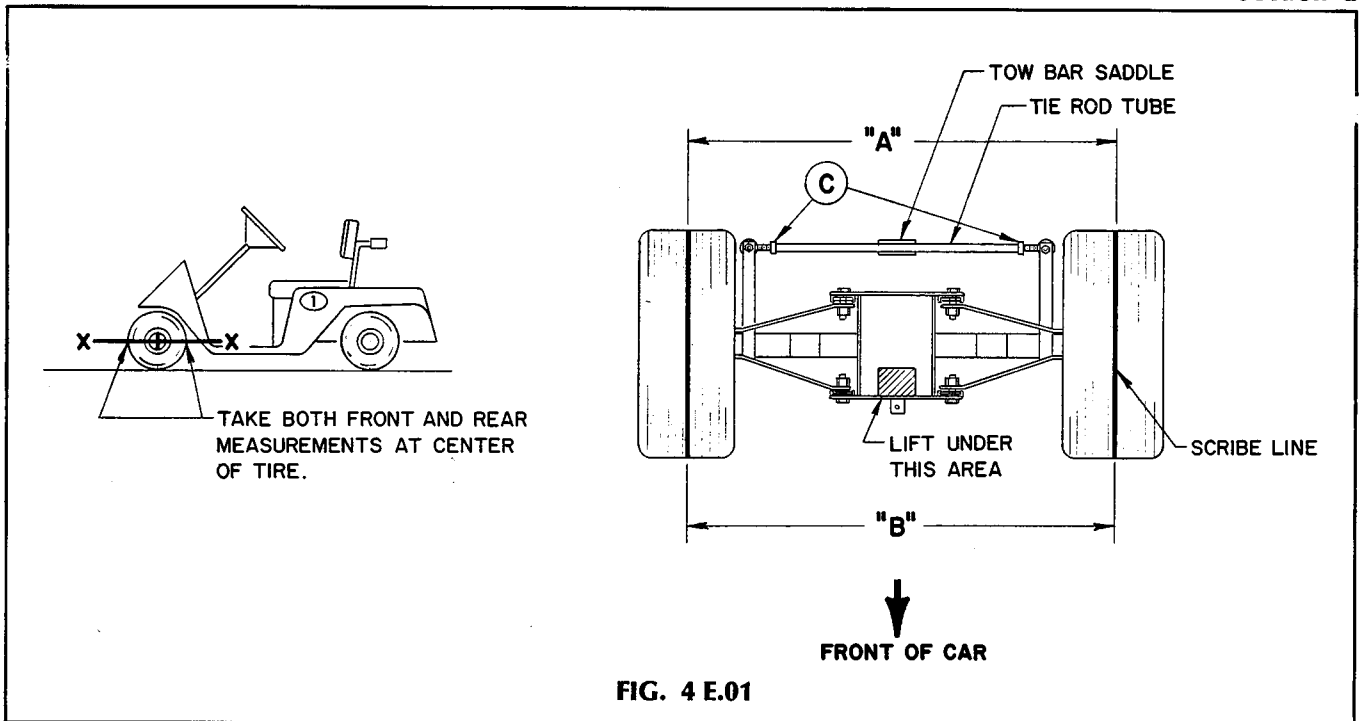
The car was designed to operate with a setting of zero to 1/4 inch Tow-In when loaded with 2 men and 2 golf bags. This means that an empty car must be set at 1/4 to 1/2 inch to allow for the 1/4 inch change which occurs in an outward direction when the weight of the passengers is applied to the front spring. This 1/4 inch change in Tow-In is due to the growth of the spring in length as it is compressed.

As the front spring is compressed and becomes longer, it forces the two wheels outboard; and since the wheel spreading is restricted on the rear side by the tie rod, they pivot on the tie rod ends and open up in front. The same action occurs over a period of time on older cars as the spring settles or sags.

#### CHECK AND ADJUST PER THE FOLLOWING PROCEDURE:

1. Jack or lift front of car.
2. Spin each front wheel and scribe or chalk a line around the circumference of each front tire between 2 tread grooves.
3. Lower car to floor and roll back and forward to allow spring to settle to its normal position. Remove all golf bags and operator/passengers from car before taking measurements.
4. Measure between scribe lines at front and rear of tires, on axis X-X as shown. Measurement at the rear of the front wheels, Dim "A", must be 1/4 to 1/2" longer than measurement at front of front wheels, Dim "B".

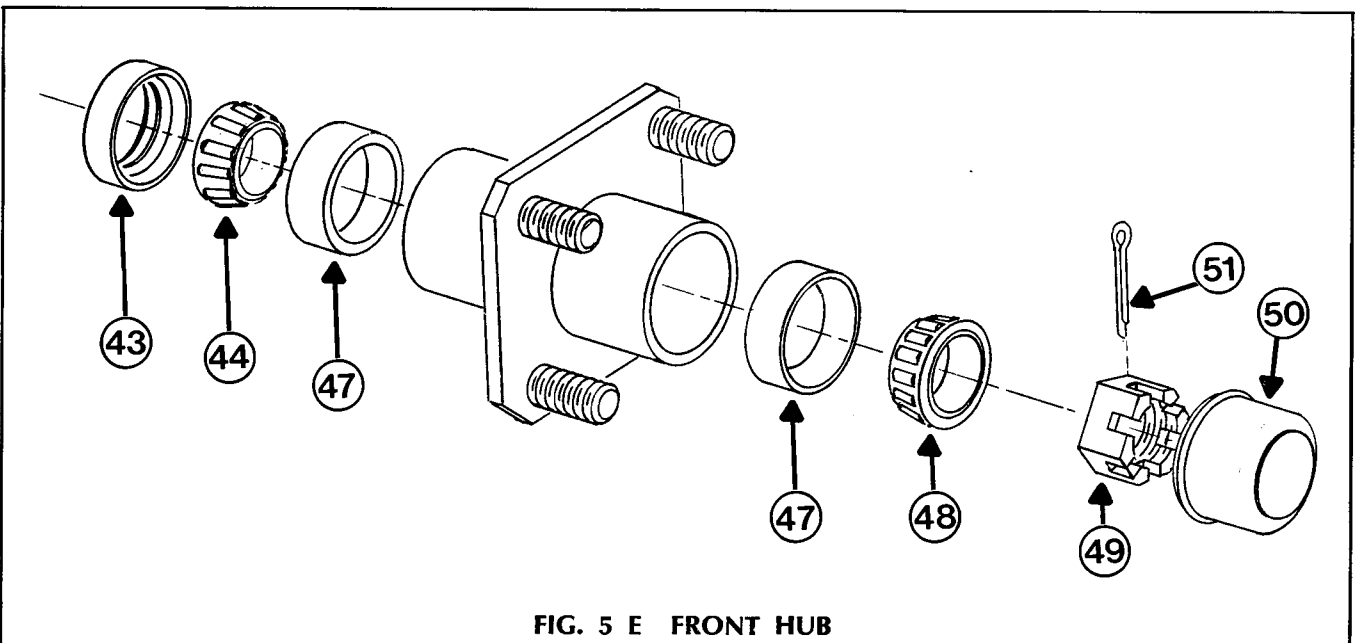
If adjustment is required, loosen clamp bolts, item "C" on tie rod assembly and rotate tie rod tube in complete turns-always leaving the tow bar saddle directed toward the ground. After adjustment tighten clamp bolts securely.



#### FRONT WHEEL BEARINGS (4 Wheel Cars) Fig. 5E

Lift front of car so that wheels are off the floor and block in place. Remove wheel lug nuts and remove wheels. Remove dust cap (50), remove cotter pin (51), remove slotted nut (49), pull hub and outer bearing (48), off spindle. To remove inside bearing and seal, insert a drift punch from outside end and lightly tap around bearing cone (44). Clean bearings, hub, seal and dust cap with a solvent and inspect for wear or damage. Worn or damaged parts should be replaced with new ones. If bearing cups (47) are worn or damaged, drift out and press in new cups. Repack bearings with wheel bearing grease, making sure grease is forced down between rollers and race.

To reassemble, insert bearing (44) into inside end of hub, insert seal (43) into hub with flanged side to the inside, press or tap seal until flush with hub tube. Slide hub onto spindle, install bearing (48), install nut (49) and tighten until hub is hard to turn, back nut off until hub will spin freely, install cotter pin (51). Add grease in dust cap and install cap. Repeat procedure for opposite wheel. Install wheels and torque lug nuts to 50-60 Ft. lbs.





**FRONT** (4 Wheel Cars) Fig. 1 F**Removal and Disassembly:**

Removal of the suspension assembly as a unit is not required for repair work. However, if removal is required, proceed as follows:

Remove four nuts from back of shield and lift off. Remove front wheels. Remove two nuts (17) and two bolts (16) from front bracket (5). Remove four bolts securing center strut to frame at top and remove strut. Remove two nuts (11), two washers (10), and two bolts (9) from rear bracket (5). Remove cotter pin (42), back nut (41) off part way to protect threads. Using a drag link tool as a lever apply pressure up on ball joint (39), strike nut with a hammer to break joint loose. Remove nut and disconnect joint. Back off on set screw at top of steering arm pivot shaft, remove top retainer ring and push shaft out. Turn steering wheel to left to allow arm to move to right and swing steering arm up and clear of mounting box. Remove four nuts (37), washers (36), four bolts (34), and plate (33). Press down on spring (32) to remove from bracket, lift assembly up and away from frame.

Reinstall in reverse order of disassembly.

**Spindle Repair:** To replace spindle (24) or king pin bushings (23), proceed as follows: Remove wheel and hub (refer to Bearing Service Procedure). Disconnect ball joint (39) from spindle arm (Refer to procedure described above). Remove nut (19), lift upper support arm (2) from king pin (28), remove thrust washer (22) and lift spindle off pin. Clean spindle with a solvent and inspect for damage or worn bushings. If bushings are worn larger than (.630 inch) press out and replace with new bushings. Press bushings in until flush with housing. **Note:** Bushing I.D. will close slightly when pressed in. If a ream operation is required, use a (.625 inch) diameter sizing reamer.

Reinstall in reverse order of disassembly. Torque nut (41) to 40 Ft. lbs. and install new cotter pin.

**King Pin Removal:** Remove nut (19), lift upper support arm (2), remove thrust washer (22), lift spindle assembly (24) from pin, remove spring washer (27), remove nut (29) and remove bolt (30).

Reinstall in reverse order of disassembly. Take care not to tighten nut (19) to a point that will disallow free rotation of spindle.

**Trunion Removal:** To remove trunion (21), remove nut (19), remove nut (15), remove bolt (14), lift upper support arm (2) up and remove trunion. Clean and inspect for wear. If small hole is worn larger than (.506 inch) or large hole is larger than (.633 inch) replace with new part. Reassemble in reverse order of disassembly.

**Leaf Spring and Bushing Removal:** Remove nuts (29), remove bolts (30), remove four nuts (37), washers (36) and bolts (34). Remove spring, check bushings for wear. If bushings are worn larger than (.510 inch) press out and replace with new parts. When replacing spring be sure center bolt head lines up with hole in frame. Reassemble in reverse order of disassembly.

## Section F

**Upper Support Arm Bushing and Camber Adjustment Cam Removal:** Remove nut (8), remove bearing nut (3), remove bolt (7), washer (6) and lift cam (4) out. Repeat on opposite side. Remove nut (15), bolt (14), and remove arm. Clean bushings and inspect for wear. If worn larger than (.506 inch), remove and press in new bushings. Ream new bushings to (.501 inch) after pressing in, if necessary. Reassemble in reverse order of disassembly and readjust camber per Camber Adjustment procedure.

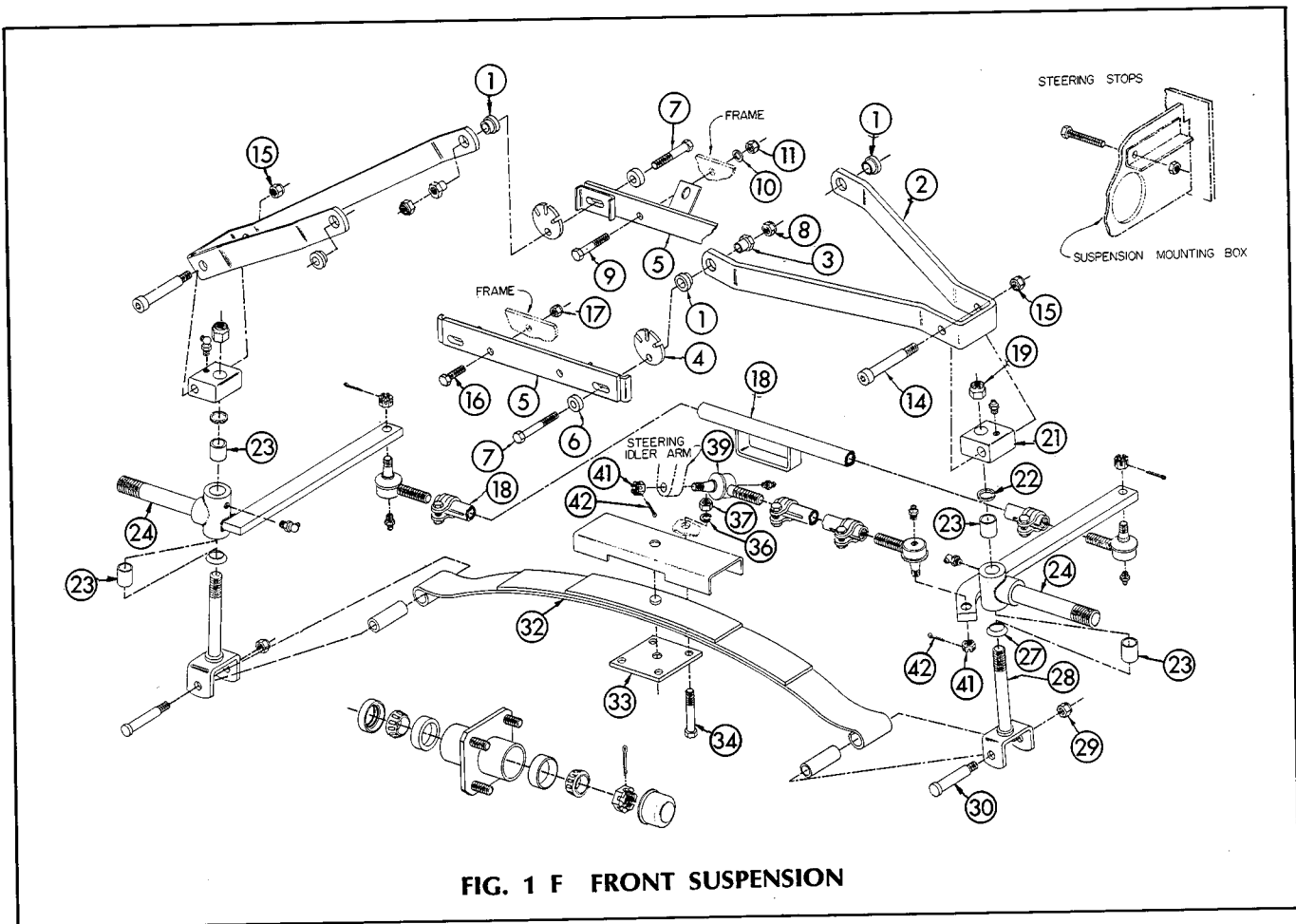


FIG. 1 F FRONT SUSPENSION

## REAR SUSPENSION (3 and 4 Wheel Cars)

Rear suspension consists of two coil springs, two shock absorbers and four rubber bushings in pivot tubes connecting the power frame to main frame. To disassemble, proceed as follows:

**Coil Spring Removal:** Disconnect bottom end of shock, hoist rear of main frame to clear top of spring and remove spring. **CAUTION:** Be sure gas line is slack at all times.

**Shock Removal:** Disconnect at both ends, collapse shock and remove. Reassemble in reverse order.

**Pivot Bushing Removal:** Lift rear of car and place supporting block or jack stands under rear axle. Place a jack under front center of power frame to take load off connecting pivots. Remove bolts and lower front of frame to give access to bushings. **CAUTION!** Extra care must be taken when lowering power frame or electrical wiring will be pulled loose and damaged. Pull bushings out, insert new bushings and lubricate with a rubber lube to assist in reassembly of frame. Replace bolts, and tighten nuts securely.

## WHEELS AND TIRES

### Tire Repair:

Your E-Z-GO is fitted with low pressure tubeless tires mounted on one piece rims which must be broken down and remounted in the same way as an automobile tire. When tire repair is necessary, proceed as follows:

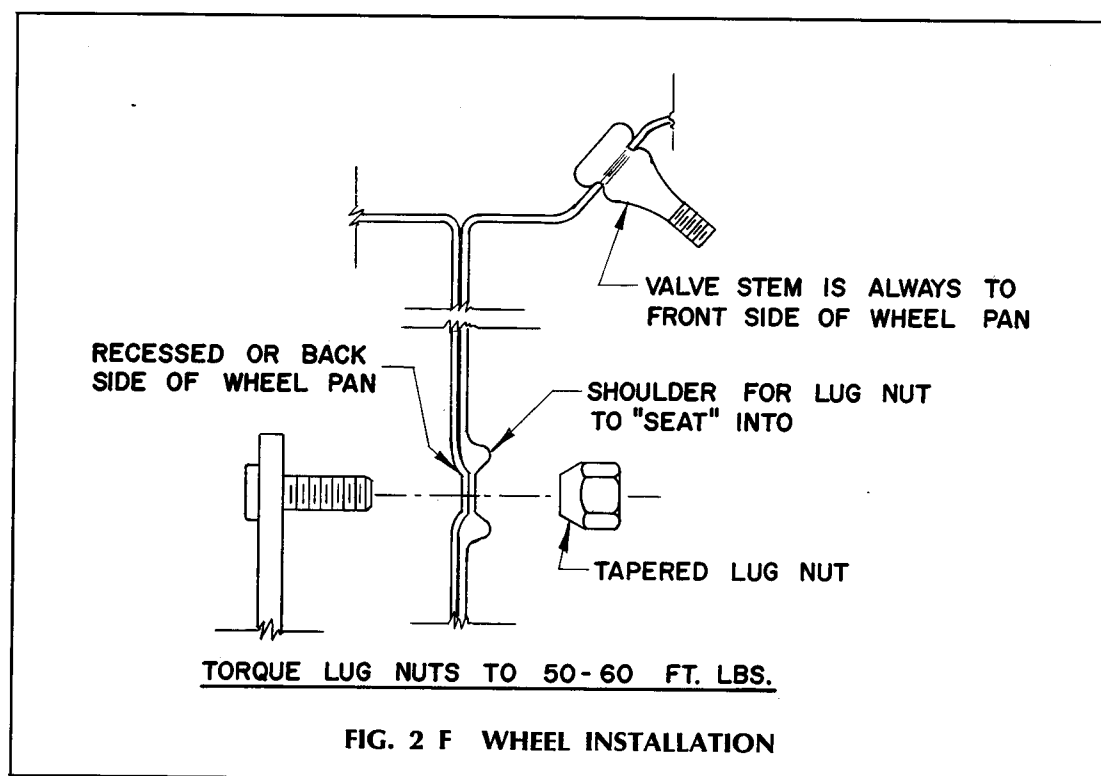
If tire is flat, remove wheel as described in preceding procedures and inflate tire to approximately 20 p.s.i. Immerse tire in water to locate air leak and mark. Small holes in casing can be plugged with a standard automotive tubeless tire repair kit, available at most automotive supply outlets. To remove tire from rim, deflate by removing valve core, break both tire beads from rim, push bead from wide side into rim recess. Using tire tool, carefully remove upper bead from rim (valve stem side). Care must be taken to prevent damage of tire bead. When bead is free of rim, insert tire tool under lower bead and pry tire off.

### Mounting Tire:

Clean both tire beads and wheel rim bead seats with a tire brush. This is important to prevent loss of air around rim. Install tire on rim (from valve stem side) using a rubber mallet and tire tool. Remove valve core and position bead against narrow flange side. Apply air pressure through stem while pressing around center of tread, pressure will build up and snap beads into place. Remove pressure and install valve core. Over inflate to approximately 30 p.s.i. to insure bead seat, adjust to specified pressure and immerse tire in water to recheck for leaks.

### Wheel Installation:

Install wheel as shown by Fig. 2 F.









Polaris E-Z-Go  
Division of Textron Inc.

# SERVICE MANUAL

## ENGINE

**MODEL  
GASOLINE  
SECTION G**

### GENERAL

#### ENGINE SPECIFICATIONS

Engine Model .....	EC25DS	Cyl. Disp. ....	244 cc
Bore (72MM) .....	2.8346 to 2.8362 in.	Stroke .....	(60MM) 2.3622 ins.
Number of Cylinders .....	1	Piston dia. ....	2.8291 to 2.8303 in.
Piston Ring-End Gap .....	.010 to .016 in.	Piston to Bore Clearance .....	.004 to .007 ins.
Compression Ratio .....	7.6	Piston Ring-Side Clearance .....	.002 to .004 in.
Spark Plug Gap .....	.028 to .030 in.	Breaker Point Gap .....	.013 to .015 in.
Max. Engine RPM .....	5000	Timing 20° Before Top Dead Center (Refer to Timing Procedure)	

#### ENGINE DESCRIPTION

The engine is single cylinder, reed valve, 2-cycle, air-cooled. Major component assemblies are cylinder, crankcase and starter-dynamo (generator) built onto the front of the crankcase. The cylinder assembly consists of a cast iron cylinder, aluminum piston and aluminum head.

#### 2-CYCLE OPERATION

The two cycle engine requires two piston strokes or only one revolution for each cycle (intake, compression, ignition and exhaust).

During the upstroke (Compression Stroke) a vacuum is created in the crankcase drawing a gasoline and air mixture from the carburetor into the crankcase. As the piston moves upward closing the exhaust port, compression of gases takes place above the piston. Firing occurs each time the piston reaches the top of its stroke.

On the downward (power stroke) the exhaust gas is released from the cylinder. At the same time, gases in the crankcase are compressed and forced up through the cylinder ports, into the combustion chamber as the descending piston uncovers the ports.

Ignition timing is produced by operation of the breaker points, ignition coil, and spark plug. The breaking of the points by a single-lobe cam on the flywheel, determines spark timing.

#### ENGINE LUBRICATION

The 2-cycle engine does not require a crankcase oil supply for engine lubrication. Lubrication is achieved by mixing oil with the gasoline.

**IMPORTANT** Use only mixture of recommended oil and gasoline as specified under Section B. Engine Fuel and Lubrication.

#### STORAGE

If the car is to be out of service for a period of months, the engine should be prepared according to the following procedure to prevent corrosion of internal parts.

Completely drain fuel tank and lines. Disconnect inlet lines at fuel pump and run engine until it stops to eliminate any gas remaining in carburetor. Remove spark plug and apply a small amount of oil in cylinder to prevent rusting. After applying oil, rotate crankshaft one revolution to assure oil coating of cylinder wall.

## Section G

### ENGINE REPAIR

When repairs are required, it is not necessary to remove the engine for disassembling the cylinder or starter-dynamo assemblies. However, disassembly of starter-dynamo components is simplified somewhat, by first removing the engine. For disassembly instructions, see pertinent procedures under Engine Disassembly.

### REMOVING AND INSTALLING ENGINE

Disconnect battery cable from positive post on battery. Remove braided ground strap from blower housing. Remove drive belt, see Removing and Installing Belt, under clutch section.

Disconnect throttle, governor and choke control cable support by unscrewing attaching bolts from blower housing. Loosen set screw on cable clamps and slide clamps off cables at carburetor levers.

Disconnect fuel inlet hose at fuel pump and plug hose to prevent gasoline from leaking.

Loosen hose clamp on air inlet hose at carburetor and slip hose from carburetor adapter.

Cut wire ties securing wires and control cables.

Disconnect wiring at the following points:

1. Unplug wire connector.
2. Three black wires, "B", "C", and "D" from F & R switch.

Remove two left and two right engine mounting bolts and lift engine out.

Install engine in reverse order of removal and check controls for correct operation as described in Control Linkages, Section D. **CAUTION!** Be sure braided ground strap is correctly reinstalled before starting engine.

### ENGINE DISASSEMBLY

#### Cylinder Disassembly:

Remove exhaust pipe, muffler, and cylinder head end motor mount as a unit by removing two nuts securing exhaust pipe to cylinder, three bolts securing motor mount to head, and four bolts securing upper muffler mount to cylinder.

Remove four screws securing cylinder air duct and remove duct. Remove spark plug, remove six bolts securing head to cylinder and remove head.

Remove four nuts and lockwashers securing cylinder to crankcase and slide cylinder off piston.

Remove two spring type retainer rings, (one from each end of wrist pin). Push wrist pin out and remove piston. Care should be taken not to damage pin and needle bearings.

### CYLINDER INSPECTION

Clean cylinder, cylinder head and piston in a solvent. If there is a thick layer of carbon on the head or piston it should be removed before washing with solvent. Extreme care must be taken to avoid scraping into the aluminum of piston or head. Carefully remove all carbon from piston ring grooves. (Break an old ring and use the broken end for removing ring groove carbon).

Check piston ring locating pins to make sure they are tight in piston. A loose pin could possibly come out during engine operation, and would not only damage the piston and cylinder wall, but the ring would turn, catch on one of the ports and break. If pins are loose replace piston.

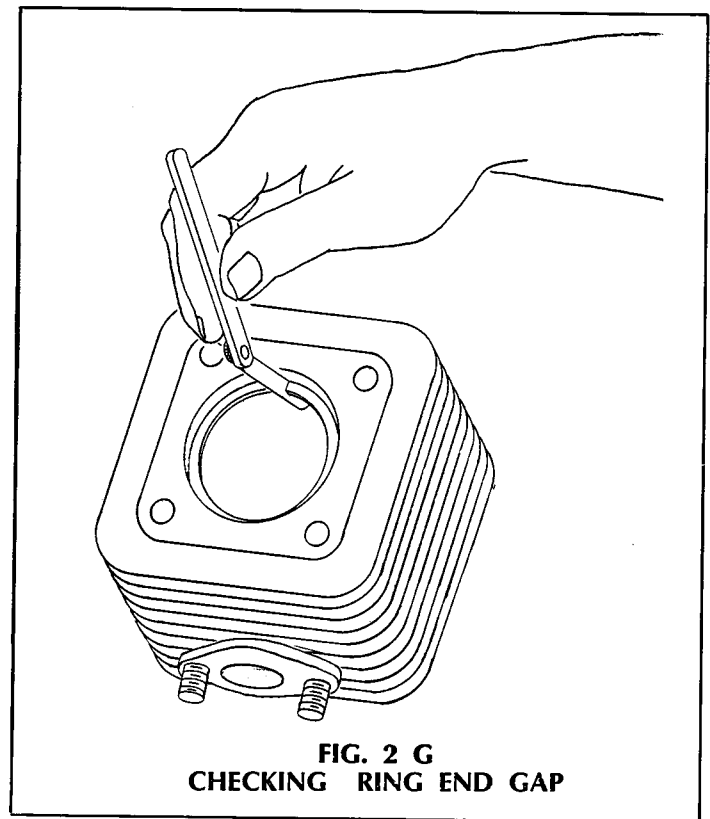
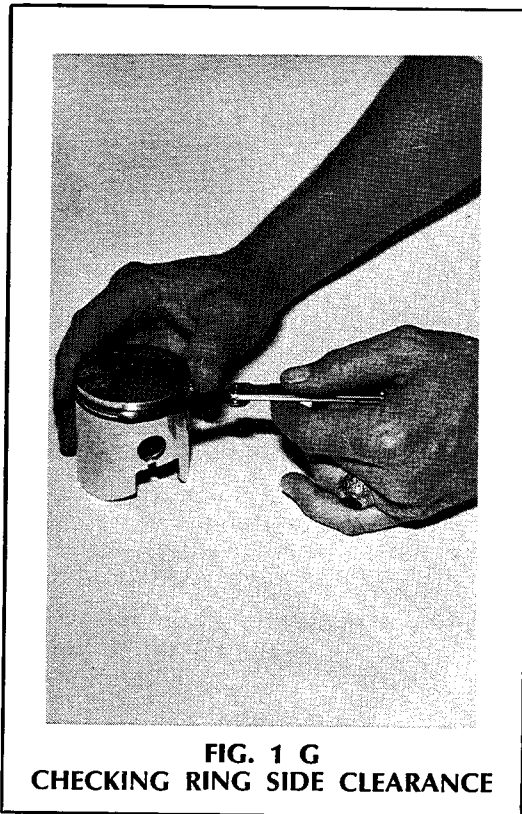
**Cylinder Inspection (Continued)**

Examine piston and cylinder for cracks, burrs, or burned spots on piston dome and for scoring on piston skirt and cylinder wall. Replace with new parts if necessary. A scored, (or grooved), piston or cylinder must be replaced.

Check piston ring side clearance as indicated under Engine Specifications. (See Fig. 1 G Checking Ring Side Clearance).

Piston ring end gap must be maintained as specified under Engine Specifications. (See Fig. 2 G Checking Ring End Gap). Thoroughly clean cylinder and install ring approximately 1/2 inch from the top. Check with thickness gauge as shown. If ring gap exceeds .016 inch and cylinder bore is not scored or worn more than .003 inch, install new rings.

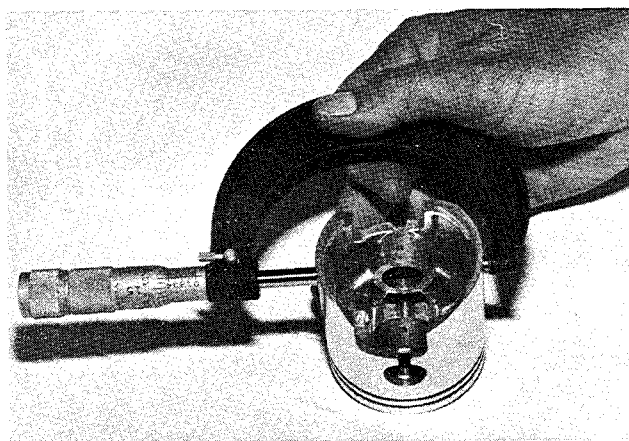
**NOTE:** When installing rings be sure they are positioned so that ring end gap is seated around ring locating pins. (See Fig 6 G Installing Cylinder).



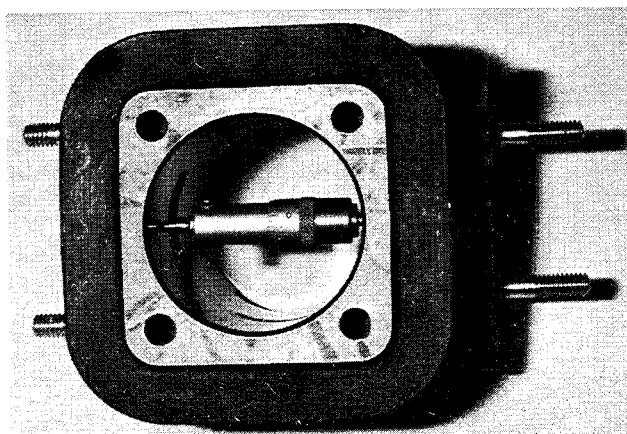
Cylinder and piston must be measured to determine if they are worn to a point where cylinder must be replaced.

Inside and outside micrometers used for measuring piston-cylinder fit should be checked together to be sure they are adjusted to read exactly the same.

Piston measurement is taken approximately 1 1/2 inch up from bottom of skirt, 45° from center line of wrist pin holes. (See Fig. 3 G Measuring Piston).



**FIG. 3 G**  
**MEASURING PISTON**



**FIG. 4 G**  
**MEASURING CYLINDER**

Bore measurement is taken at the top of cylinder, approximately 1/4 inch above exhaust port. (See 4 G Measuring Cylinder).

Determine piston to bore clearance by subtracting piston measurement from bore measurement. Example: If bore is 2.8346 inches and piston is 2.8271 inches, piston to bore clearance will be .0075 inch. In this case the piston is worn and must be replaced. If cylinder bore is scored or is worn more than .003 inch a new cylinder should be installed.

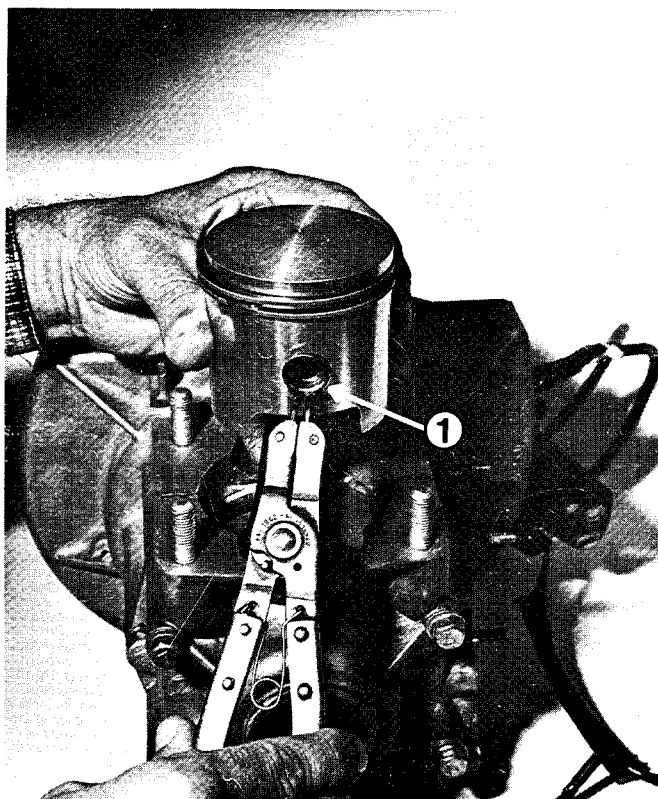
Inspect the wrist pin bearings and spacers for wear. If they show appreciable wear, replace bearings, spacers and pin. **NOTE:** The wrist pin should fit "finger tight" in piston, if loose, a new piston is required.

Check connecting rod lower bearings for excessive wear. This check must be made with piston removed and rod checked for excessive up and down movement or side play. If bearings are worn a new crankshaft and rod assembly is required. (See Crankcase Repairs).

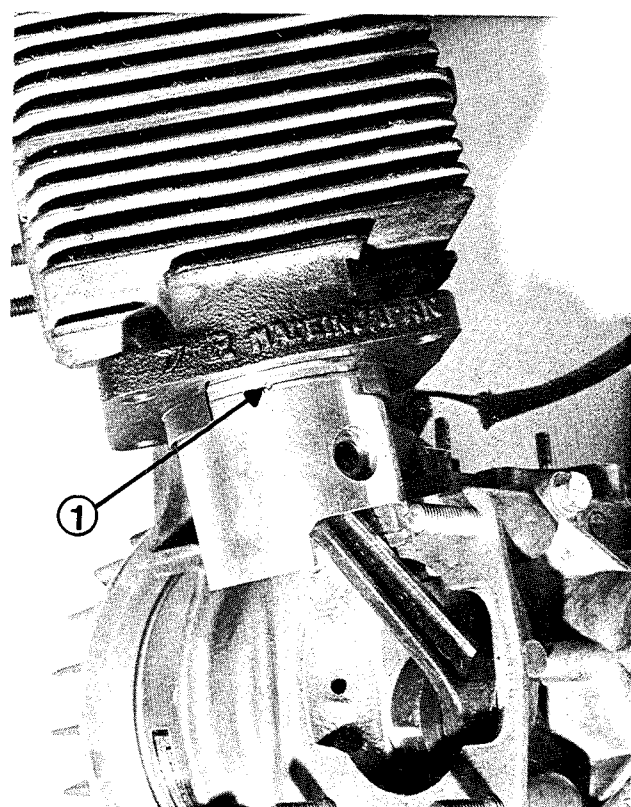
#### **Cylinder Reassembly:**

Install wrist pin bearing and spacers. Coat bearings with oil to ensure against damage during first few minutes operation.

Insert wrist pin in one side of piston, **NOTE:** (The rectangular hole in the side of the piston must be positioned opposite exhaust port) align piston and pin to rod and install pin. Install pin retainer rings. (1) **IMPORTANT:** The gap in retainer ring should be located at either the top or bottom of ring land. This will eliminate land scuffing and retainer failure due to engine "Harmonics". (See Fig. 5 G Installing Piston).



**FIG. 5 G  
INSTALLING PISTON**



**FIG. 6 G  
INSTALLING CYLINDER**

Install new cylinder base gasket, NOTE: Be sure gasket is positioned correctly. Using a suitable ring compressor, slide cylinder over piston and secure to crankcase. Be sure exhaust port faces the correct way. Also check position of rings to be sure they are positioned so that ring gap is correctly seated around locating pins. (1) (See Fig. 6 G Installing Cylinder). Torque cylinder securing nuts to 24-28 Ft. lbs. It is best to snug the four nuts using a criss-cross pattern, then tighten, rather than tightening one at a time.

Install new head gasket with widest metal edge turned down against cylinder, position head, install head bolts, (three with tall head to match holes in motor mount) and torque to 20-22 Ft. lbs. using a criss-cross pattern.

Install cylinder air duct, spark plug, exhaust pipe, muffler and mount assembly. It is good practice to install new gaskets at exhaust and carburetor connections. NOTE: If carburetor controls were disconnected during disassembly, refer to Control Linkage, Section D, for adjustment procedures.

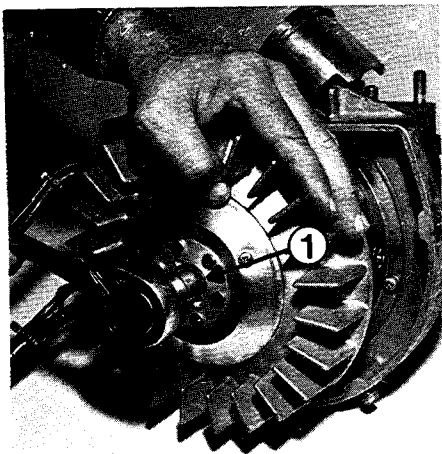
### **STARTER-DYNAMO DISASSEMBLY**

Remove exhaust pipe by removing four nuts securing pipe to cylinder and muffler. Remove four screws securing blower housing to crankcase, loosen two screws securing housing to cylinder air duct, and remove housing.

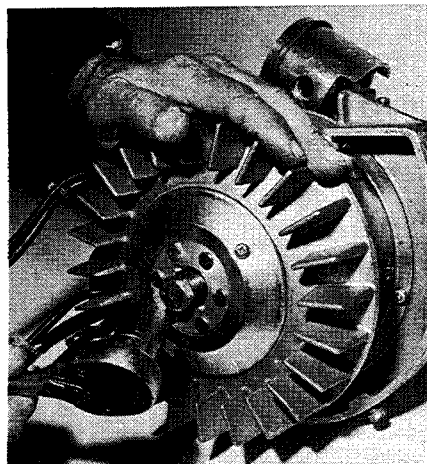
Bend locking tabs (1) away and remove draw bolt securing flywheel. Remove two screws securing access cover and remove cover. (See Fig. 7 G)

Using special puller bolt, (E-Z-GO Part Number A-14709-G1) Remove the flywheel. (See Fig 8 G Removing Flywheel).

## Section G



**FIG. 7 G**

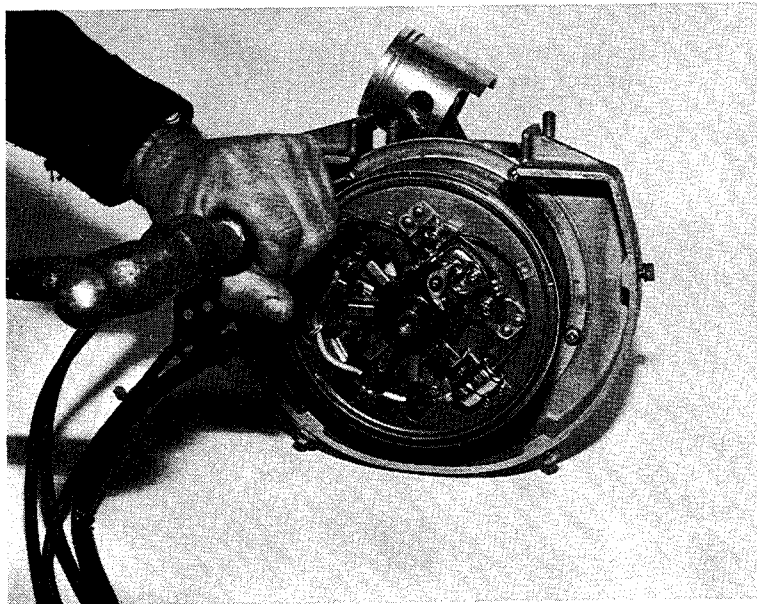


**FIG. 8 G  
REMOVING FLYWHEEL**

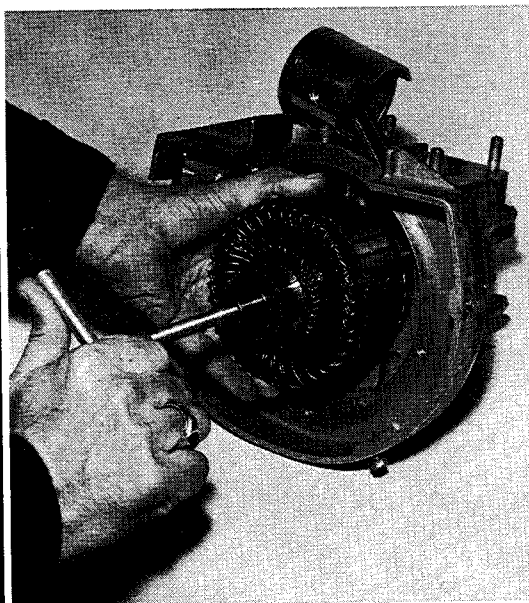
Use an impact driver (See Fig. 9 G Removing Stator Assembly) to loosen five screws securing stator assembly to crankcase, remove screws, push brush springs back and slide brushes up in holders, remove stator assembly and disconnect wiring at the following points:

1. Unplug wire connector.
2. Black wire from negative terminal on coil.
3. Blue wire from positive terminal on coil.
4. Three black wires, "B", "C", and "D" from F & R Switch.

Use special puller, Part No. A-12579-G1 to remove armature. (See Fig. 10 G) If armature testing or commutator rework is required, have work performed by a qualified motor repairman. To clean commutator use solvent and medium bristle brush and dry off with compressed air.



**FIG. 9 G  
REMOVING STATOR ASSEMBLY**



**FIG. 10 G  
REMOVING ARMATURE**

## STARTER-DYNAMO REASSEMBLY

Position armature on crankshaft, taking care to align keyway with key in shaft.

Inspect brushes for wear. If brushes are worn to within 1/16 inch of wear mark, replace brushes.

Position stator assembly, and secure with five screws. Position brushes to commutator and check for free sliding in holders.

Position flywheel on armature shaft, taking care to align keyway with key in shaft: **NOTE:** Use extreme care not to damage the fiber block on the breaker points or bend the cam lobe oiler bracket. Damage can be avoided by rotating the crankshaft so that the flywheel cam lobe will be positioned to the lower side when installing flywheel.

Install access cover to flywheel using two screws and lockwashers. Install draw bolt and torque to 20-24 ft. lbs. Bend locking tab to lock draw bolt.

Install blower housing and exhaust in reverse order of disassembly. Reconnect wiring and secure to frame. **CAUTION!** Be sure braided ground strap is correctly reinstalled before starting engine.

## CRANKCASE REPAIRS

If crankcase repairs are necessary the engine must be removed from frame. Follow procedure outlined under Removing and Installing Engine.

After removing engine, remove draw bolt securing drive clutch to shaft. Install clutch puller (Part Number A-12580-G1) and force clutch off.

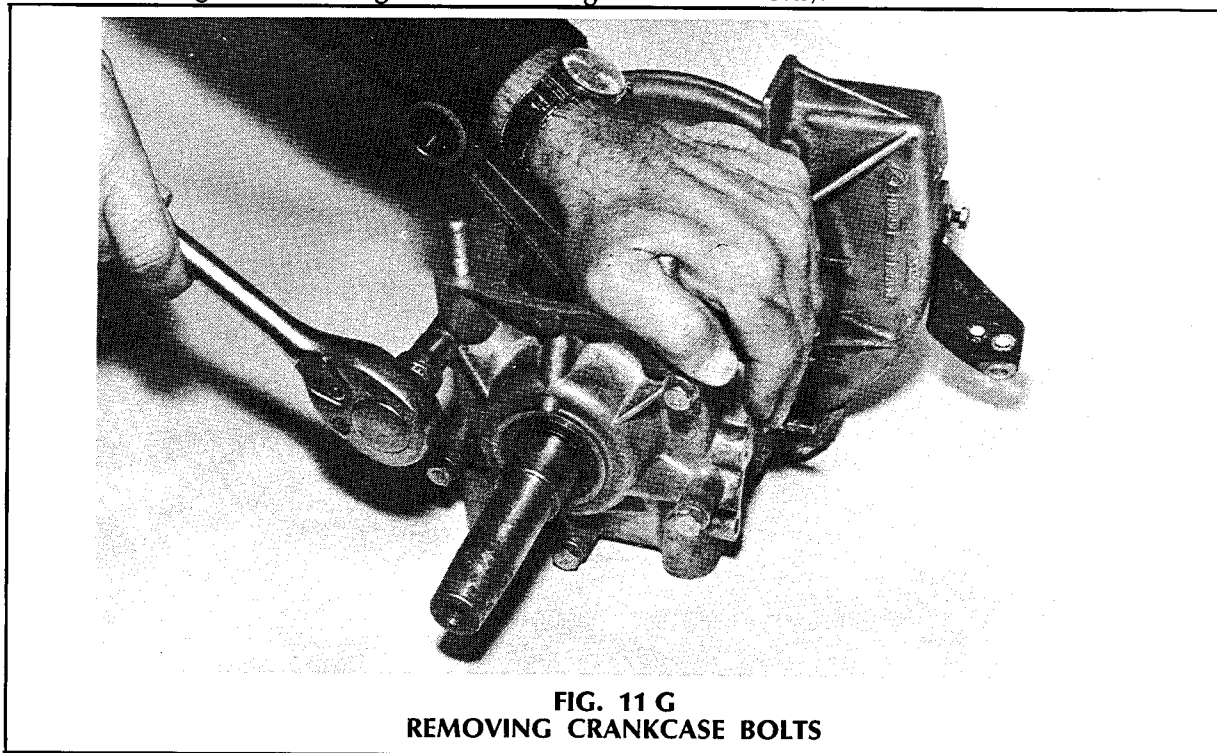
Remove blower housing, cylinder air duct, cylinder and starter-dynamo. Refer to pertinent procedures.

### Crankshaft Seals

If disassembly is for replacement of seals only, removal of the cylinder is not required. Remove clutch and starter-dynamo assemblies, pry worn seals out. Coat new seals with light oil before installing.

### Crankshaft Bearings

To remove bearings the crankcase must be disassembled. Remove cylinder, starter-dynamo and clutch. Remove four bolts securing mounting base of cylinder to crankcase. Remove five bolts securing crankcase halves together. (See Fig. 11 G Removing Crankcase Bolts).



**FIG. 11 G**  
**REMOVING CRANKCASE BOLTS**



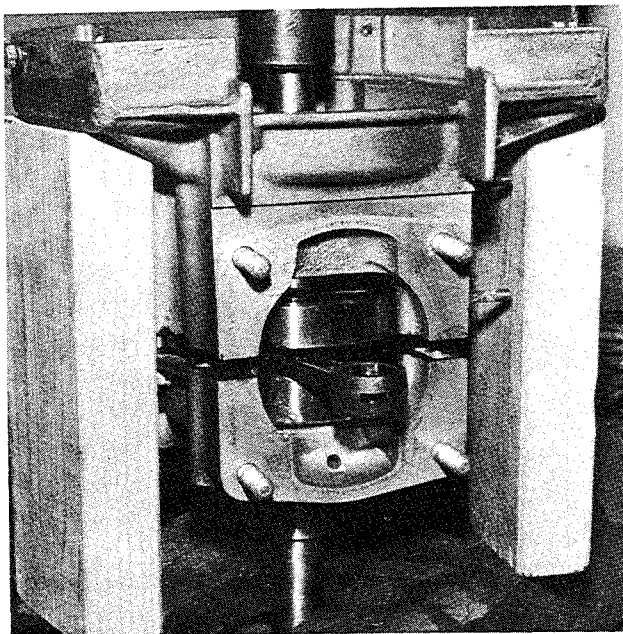
## Section G

Using arbor press, separate crankcase halves. (See Fig. 12 G Separating Crankcase).

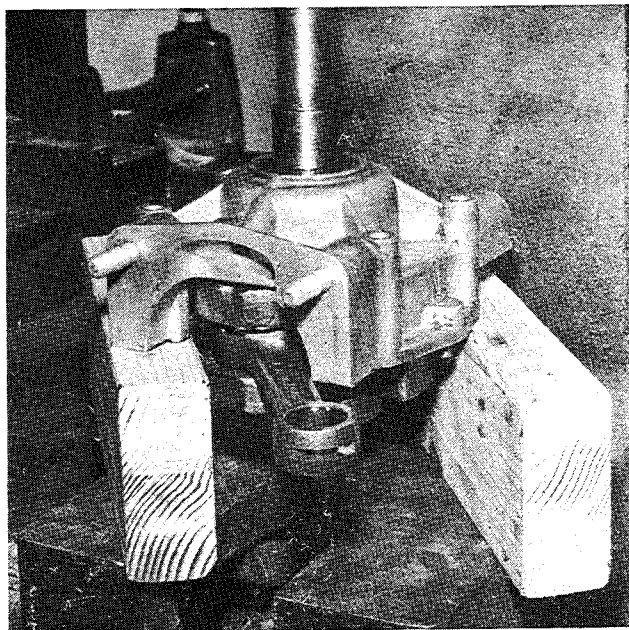
Press crankshaft from rear case half. (See Fig. 13 G Removing Crankshaft).

Remove shaft seals. (See Fig. 14 G Removing Seal).

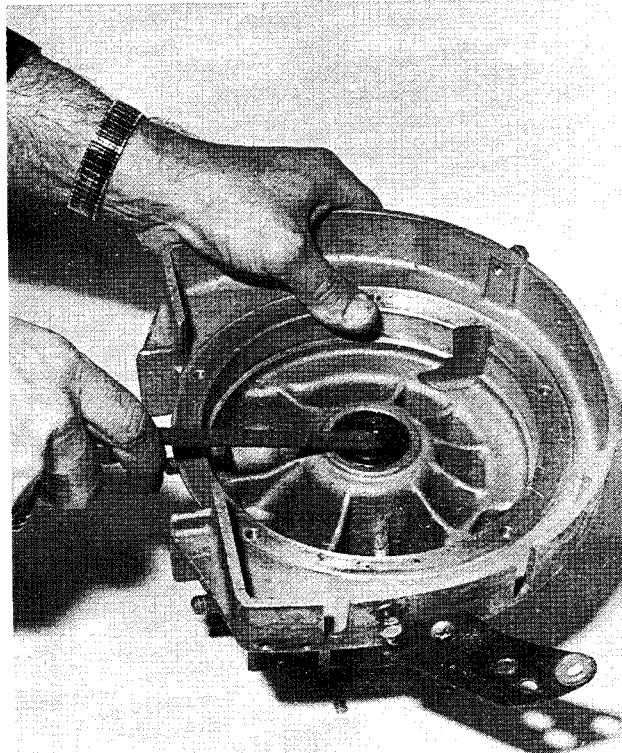
Press bearings out from side opposite seal seat. (See Fig. 15 G Removing Bearings).



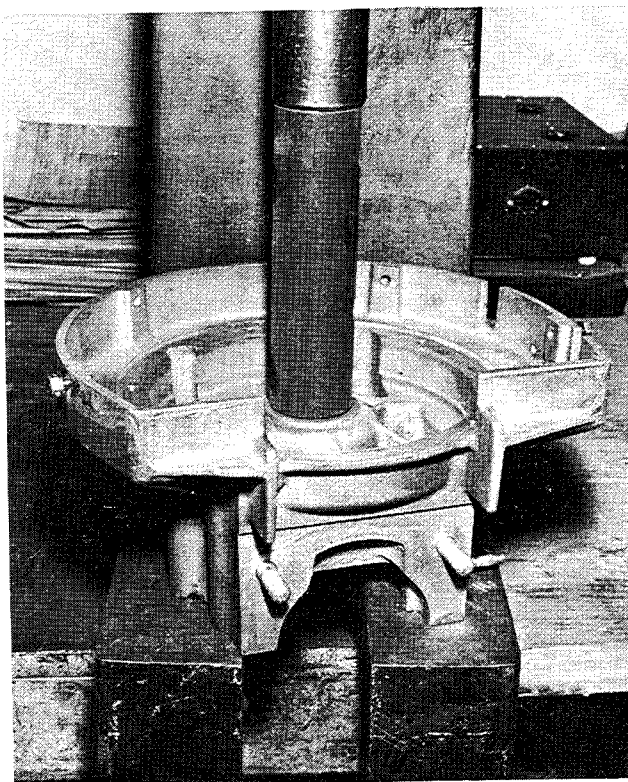
**FIG. 12 G  
SEPARATING CRANKCASE**



**FIG. 13 G  
REMOVING CRANKSHAFT**



**FIG. 14 G  
REMOVING SEAL**



**FIG. 15 G  
REMOVING BEARINGS**



If new rod bearings are required, the complete rod and crankshaft assembly must be replaced.

### Assembling Crankcase

Clean all parts thoroughly before reassembly.

Press new bearings and seals into case halves. **NOTE:** Install bearings inside opposite seal seat and coat with oil.

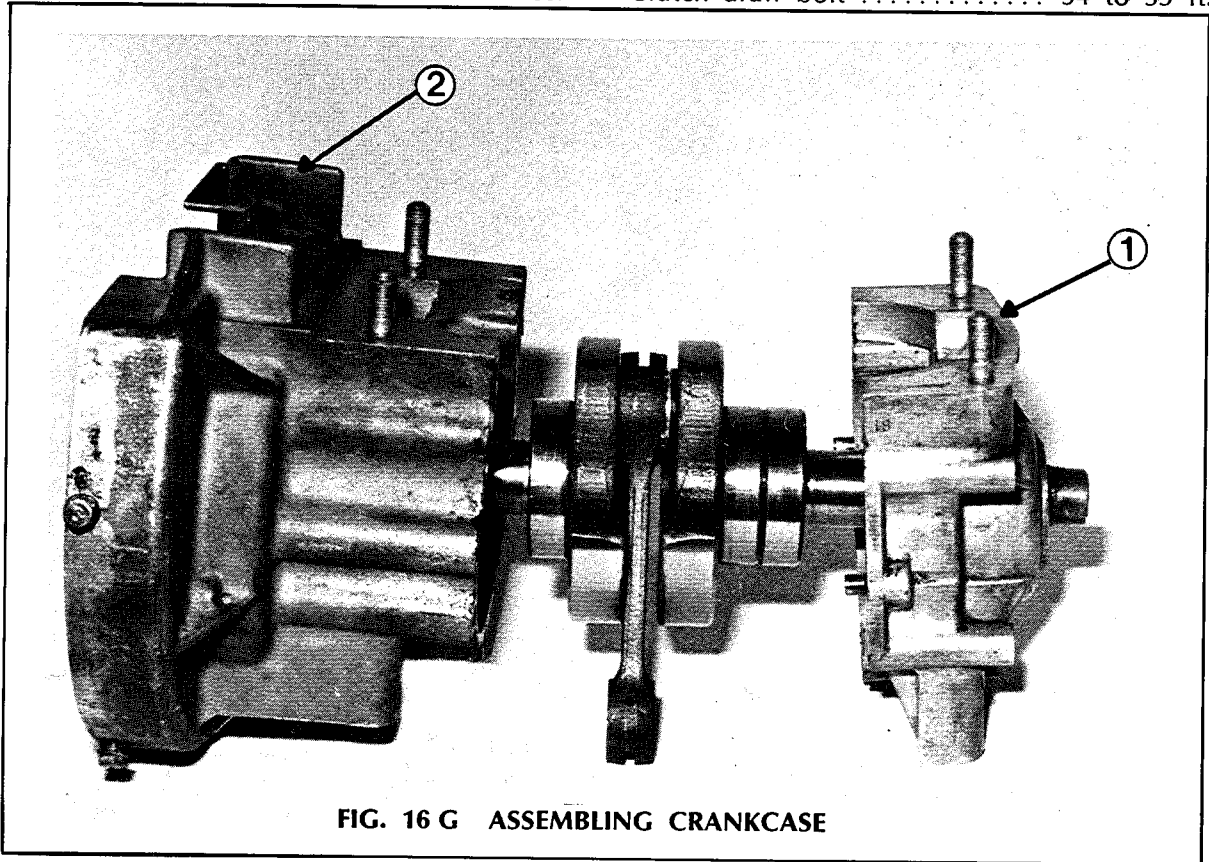
Press clutch end of crankshaft into rear half of crankcase (1). Coat case seal surfaces with an appropriate sealer, insert armature end of shaft into case half (2), press case together, Fig. 16 G).

Install five crankcase bolts and torque to 18-20 ft. lbs. using a criss-cross tightening pattern.

Referring to pertinent procedures, reassemble remaining engine parts.

### ENGINE ASSEMBLY-BOLT TORQUE REQUIREMENTS

Crankcase .....	18 to 20 ft. lbs.	Flywheel .....	20 to 24 ft. lbs.
Cylinder .....	24 to 28 ft. lbs.	Spark Plug .....	18 to 21 ft. lbs.
Cylinder Head .....	20 to 22 ft. lbs.	Clutch draw bolt .....	34 to 35 ft. lbs.



### ENGINE MOUNTS

To replace mounts, the engine must be removed (Refer to Engine Removal). If either of the four mounts require replacement, it is recommended that a complete new set be installed. The mount must be installed with the long center section up.

Replacement mounts are furnished with screws for securing. Remove existing rivets by drilling or by cutting with a chisel.



**GENERAL**

Cars manufactured from February 23, 1976 to September 12, 1976 (Serial #104768 thru 115280) were equipped with an electrical system which did not have a starter blocking relay in the system. This electrical system is shown in Control Wiring — Diagram Fig. 1-H.

Cars manufactured from September 13, 1976 and subsequent, are equipped with a electrical system which contains a combination voltage regulator and starter blocking relay assembly. The starter blocking relay opens when the generated voltage becomes higher than the battery voltage as the engine speeds up. The relay opens the starting circuit and drops the starter solenoid out of the system. This system is shown in control Wiring Diagram, Fig. 2H.

**CIRCUITS AND CONTROLS**

The electrical system is 12-Volt utilizing a combination starter-dynamo generating unit built into the engine crankcase, in conjunction with a voltage regulator and a starter solenoid, forward-reverse control and storage battery using a negative grounded system.

The control system consists of forward-reverse switch, charging circuit control switch (double micro), voltage regulator, starter solenoid, accelerator controlled electrical cutout switch and a key switch.

Ignition spark is produced by a 12-volt coil through flywheel cam operated breaker points.

Components of the starter-dynamo unit are the stator assembly with 8 field coils, and the armature rotor with the commutator formed on its flywheel shaft end. The armature is mounted directly on the engine crankshaft. The field windings are combination starter and generator coils. The outside half of each coil is series wound with heavy gage wire for starting; the inside half is series wound with lighter gage wire for generating. Four spring loaded carbon brushes are mounted on the stator housing.

**STARTER (Fig. 1 H)**

When starting engine the 8 field coils are in series with the armature to operate as a motor. This circuit is controlled by a key switch, a fuse, an accelerator controlled cutout switch, a solenoid switch and forward-reverse switch. The two switches (1 & 2) are series connected with the battery and starter solenoid coil. With key switch in "ON" position battery current is available to cutout switch (2) which is open until accelerator pedal is depressed. When pedal is depressed the plunger on switch (2) is released, contacts close and the ignition circuit is energized. Battery current then energizes starter solenoid closing contacts. Battery current then flows through F & R switch (3) to starter. Starter now functions to start engine.

The engine can be stopped either by releasing accelerator pedal to full up position or by turning key switch to "OFF" position. When accelerator pedal is released the plunger on switch (2) is depressed by a disc mounted on an actuator rod connected to the accelerator pedal, contacts open, and ignition circuit is de-energized.

## Section H

### GENERATOR

When engine is running the starter field coils are excited and current is generated by the armature. This current is used for charging the battery and for the ignition system. Generated output is controlled by the voltage regulator at 14 volts/14 amps without regard to engine R.P.M. However, the charging current will vary depending on condition of battery. If battery is fully charged current is controlled at 3 amps to 5 amps.

The charging circuit control switch (4) (double micro) functions to control the polarity of current flow for forward or reverse engine rotation. This switch is cam operated by the forward-reverse switch.

### WIRING

#### Circuit Testing

**CAUTION!** Before making any test of wiring components disconnect battery cables from battery post.

Electrical test of the wiring for continuity can be made with a "multitester" meter, available through E-Z-GO Service Parts or your nearest E-Z-GO distributor. Set the meter selector knob to the ohms scale and check continuity between each circuit component as indicated. Example: If cutout switch is open or if there is a hidden break in wiring, the meter will read infinity. Another method of testing is by use of a volt meter, in which case the battery is not disconnected. To use the volt meter, connect one lead to battery positive post and use the other lead to check from terminal to terminal of each circuit component until open circuit is located.

### QUICK ANALYSIS GUIDE

#### I. Starter Fails to Operate — (Battery OK)

1. Turn on key switch.
2. Place F & R indicator in forward.
3. Listen for audible "click" of solenoid Sw. while depressing accelerator pedal.
  - A. If audible "click" of solenoid Sw. is heard
    - a. Refer to testing starting circuit.
    - b. Check items 8 through 11.
  - B. If no audible "click" of solenoid Sw. is heard
    - a. Refer to testing starter circuit.
    - b. Check items 2 through 7.

#### II. Starter Weak or Hesitates — (Battery OK)

1. Starter system checks.
  - A. Refer to testing starting circuit.
  - B. Check items 8 through 11.
  - C. Inspect commutator (on armature) for cleanliness.
2. Charging system checks.
  - A. Refer to testing charging circuit.
  - B. Check items I and II.

### TESTING IGNITION CIRCUIT

**If engine will not run, but starter will turn engine.**

1. Check for loose wires at terminals and correct connections.
2. Check for hot electrical charge thru spark plug ignition wire as follows: Remove cap from spark plug and hold ignition wire assembly approximately 1/4" from the top of the spark plug; look for a blue or hot electrical arc.
3. If there is a hot arc in Step 2 remove the spark plug from the engine and check for fouled condition. Replace plug if necessary. Gap spark plug to .028" to .030".
4. If there is a weak or no arc in Step 2, check the spark plug ignition wire for loose terminals. Check ignition wire by substituting it on another engine or using one that is known to be good.

5. Check the ignition coil by temporarily attaching another one that is known to be good. It is not necessary to place in mounting bracket; just attach wires. If engine then operates replace old coil.
6. Inspect breaker points and condenser for proper gap and condition. Adjust and clean points if they look O.K. Replace with a new set if the points are pitted or burned. If points are changed, set gap to .015 inches.
7. Check engine timing per Timing Procedure.

### TESTING STARTING CIRCUIT

**CAUTION!** Disconnect battery for steps (1) through (8).

If engine will not turn over, forward or reverse, check the following:

1. Check the battery for voltage reading which should be 12.4 to 12.8 volts. Also check specific gravity with hydrometer. Charge battery if below 1.220 specific gravity. Check for loose or dirty battery post connections.
2. Check for blown fuse, replace if necessary with Buss AGC 25 amp fuse.
3. Check for loose wires at terminal connections.
4. Check complete electrical system for correct circuitry. See (Fig 1 H or 2 H) Wiring Diagram.
5. Check for worn insulation and bare wires touching frame. Bare wires will cause a short circuit.
6. Check for continuity through the key switch. Set volt-ohm meter on XI scale, place positive (+) probe on terminal with blue wire attached and negative (—) probe on terminal with black wire. Reading on meter should be "O" ohms with switch key in "ON" position. If meter does not register replace switch.
7. Check for continuity through the accelerator controlled cutout switch. Place probe on black wire terminal on key switch and the other probe on the (ST) terminal of solenoid and depress the accelerator pedal. If the ohm meter shows "O" ohms, the switch is good. If the meter does not register check the black wire from key switch to cutout switch and from cutout switch to solenoid. If wires and connections are good replace cutout switch.
8. Check electrical contacts in the F & R switch for continuity. Set volt - ohm meter on XI scale.
  - A. With F & R indicator in forward position, place (+) probe on terminal "A" and (—) probe on terminal "B", meter reading should be zero.
  - B. Place (+) probe on terminal "D" and (—) on terminal "C", meter reading should be zero.
  - C. With F & R indicator in reverse position, place (+) probe on terminal "A" and (—) probe on terminal "D" meter reading should be zero.
  - D. Place (+) probe on terminal "C" and (—) probe on terminal "B", meter reading should be zero.
9. Check starting solenoid operation. Turn key switch "ON" and the forward-reverse switch to forward or reverse position. Connect battery.
  - A. Place volt meter positive (+) probe on terminal "M" on solenoid (refer to Fig. 1 H). Place negative (—) probe on terminal "B". The volt meter should indicate approximately 12 V.
  - B. Depress accelerator pedal. Volt meter will return to "O" voltage if the solenoid contacts are closing.
  - C. If "O" voltage is **not** indicated while accelerator pedal is depressed, replace the solenoid.

## Section H

### 10. Testing Starter Blocking Relay

- A. Jack up car so that one rear wheel is free to spin.
- B. Set volt meter on 50 V.D.C., place black negative (—) probe on negative (—) post on battery and positive probe on "ST" terminal on solenoid.
- C. Place F & R indicator in forward.
- D. Start engine and accelerate slowly.
- E. When engine starts, needle should jump up to approx. 12 volts, then return to "O". If needle does not return to "O", replace the regulator/relay assy.

### 11. Check armature brushes for wear and arcing. The brushes are approximately show as $\frac{3}{4}$ " long when new and if they are worn down to the marked line or down to $\frac{1}{2}$ " long replace. Also replace brushes if they show signs of heavy arcing or are chipped. Use the following procedure to check armature brushes to continuity.

- A. Place ignition (key) switch in "OFF" position and forward-reverse switch in neutral position.
- B. Set volt-ohm meter on XI scale, touch one test probe to ground and the other probe to "C" terminal on the forward-reverse switch.
- C. Rotate the dynamo armature by turning the drive clutch by hand. The meter should read approximately "O" ohms and show no deflection of the meter indicator hand when the engine dynamo is rotated. This will indicate continuity only thru the armature brushes.

Brushes should function O.K. if the above test results are satisfactory. If reading is not approximately "O" replace the brushes and remove the armature for growler test by qualified electric motor repairman. If growler test is O.K. have repairman rework commutator. If growler test is not O.K., replace armature and brushes.

### 12. Check the starter field windings.

- A. Check for open circuit in field coils. Place forward-reverse switch in neutral position.

Set volt - ohm meter on XI scale, place probes on forward-reverse switch terminals "B" and "D" Meter will indicate "O" ohms if an open circuit **does not** exist.

If the meter does not indicate "O" ohms, replace the startor assembly.

**NOTE:** The above test will point out open circuits only. Visual inspection must be used to determine if a short circuit or burnt coil exists.

If upon inspection, the insulation on the field coils appears blackened or charred, the serviceability of the coils is questionable. Burnt or scorched coil insulation is a symptom of coil overheating due to overloads, grounded or short circuited windings.

### TESTING CHARGING CIRCUIT (Refer to Fig. 1 - H)

- I. If battery charge is insufficient check the following:

- A. Check battery for dead cell or loose or corroded terminal post.
- B. Check all terminals for proper and tight connections.
- C. Check charging voltage by the following method.

1. Jack up car so that one rear wheel is free to spin.
2. Set volt meter on 50 V.D.C. Place negative (—) probe on negative (—) **post** on battery and positive (+) probe on positive **post** on battery. Observe battery voltage.
3. Start engine and accelerate between 2000 to 3000 R.P.M.
4. Observe meter for reading between observed battery voltage and 15 volts in both forward and reverse engine operation.

5. If voltage is above 15 volts, replace the regulator.
6. If no increase over battery voltage is observed this is a sign of malfunction in the charging circuit.

(If charging indicated good in one direction only refer to Section II)

If low voltage is observed check the following:

7. Check the voltage regulator for malfunction.
  - a. Place negative (—) test probe on terminal "E" on regulator and positive probe on terminal "A" on regulator.
  - b. Start Engine and accelerate between 2000 to 3000 R.P.M.
  - c. Momentarily ground terminal "F" on regulator to chassis.
  - d. If voltage reading increases over previously noted battery voltage install a new regulator.
  - e. If voltage reading does not increase, proceed to following steps.

**NOTE:** Do not remove cover from voltage regulator. This unit is set and sealed by the manufacturer and is not adjustable. If a charging problem is traced to the regulator replace it with a new unit.

8. Check the stator charging circuit as follows:
  - a. Disconnect harness connector (5).
  - b. With the volt - ohm meter set on Rx1 a reading of 4 to 5 ohms should be observed when one test probe is connected to the yellow Wire and other test probe is connected to the green wire on engine half of connector.
  - c. Then read either yellow or green to ground. The ohm reading should show infinity. If reading approaches 0 on meter replace stator assembly. If results are good reconnect harness connector.
9. Check charging circuit control switch (double micro) as outlined in Step II below.
10. If the low voltage problem still exists, review steps C-1 through C-9.

II. If charging is in One Direction Only, check the following:

- A. Check the Charging Circuit Control Switch (double micro). Disconnect the four wires and perform continuity check with ohm meter, set on X1 scale. Be sure to check all (4) circuits.

With F & R indicator in reverse position the meter should read "infinity" between "common" and "N.O." terminals and should read "zero" between "common" and "N.C." terminals on each micro switch.

With F & R indicator in forward position, the meter should read "zero" between "common" and "N.O." terminals and should read "infinity" between "common" and "N.C." terminals on each micro switch.

If meter readings are incorrect, defective micro switch should be replaced.

- B. Check for trash or foreign material under lever blades of double switch that may cause hanging and prevent one lever blade from operating. Levers on both switches must operate in unison.

**CAUTION:** Be sure that lever arm appendage connected to the lever with the roller attached is on top of the lever arm on the adjacent switch. If this lever arm appendage is under the adjacent switch only one switch will work when the roller is in a depressed position.

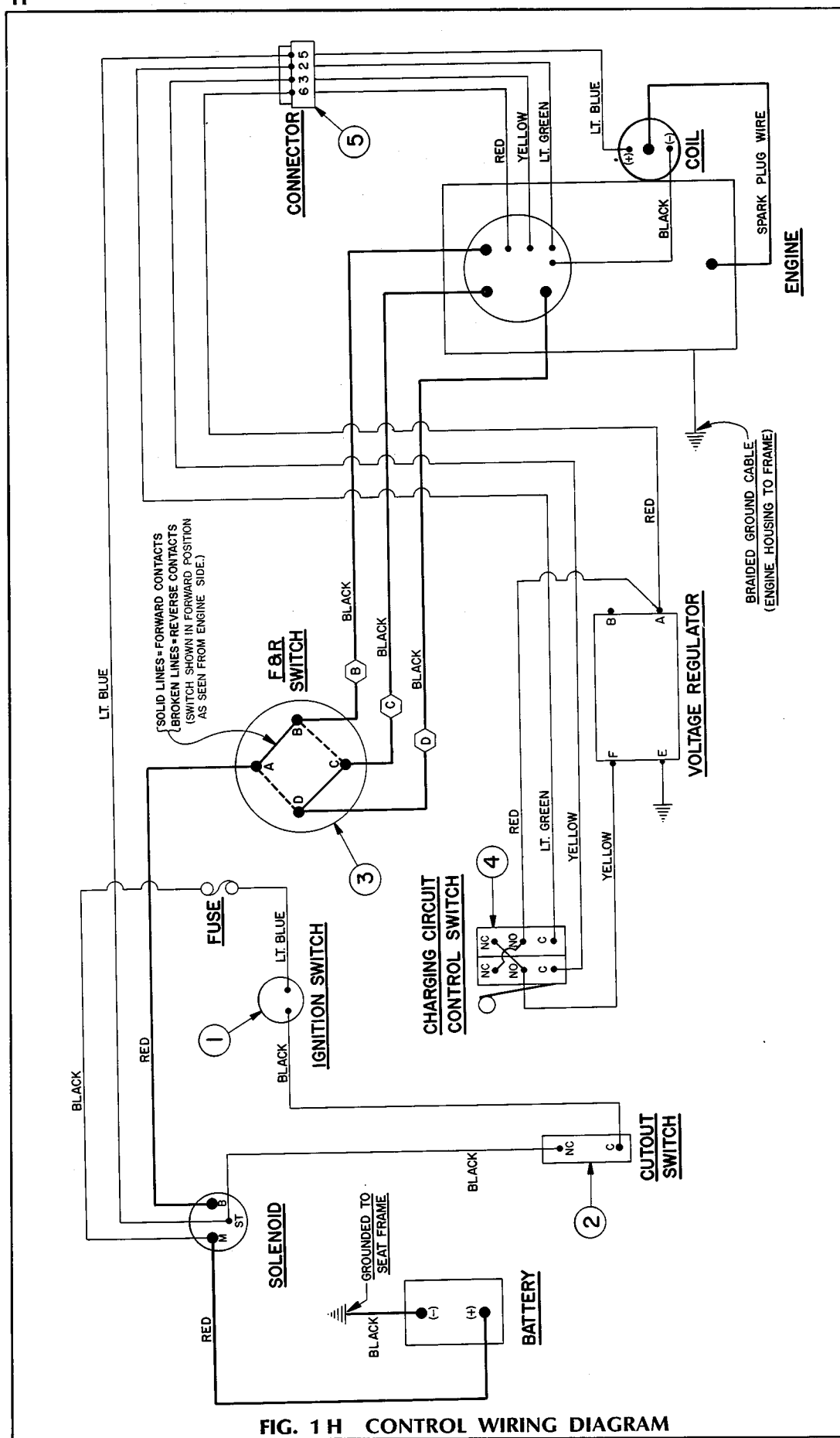


FIG. 1 H CONTROL WIRING DIAGRAM



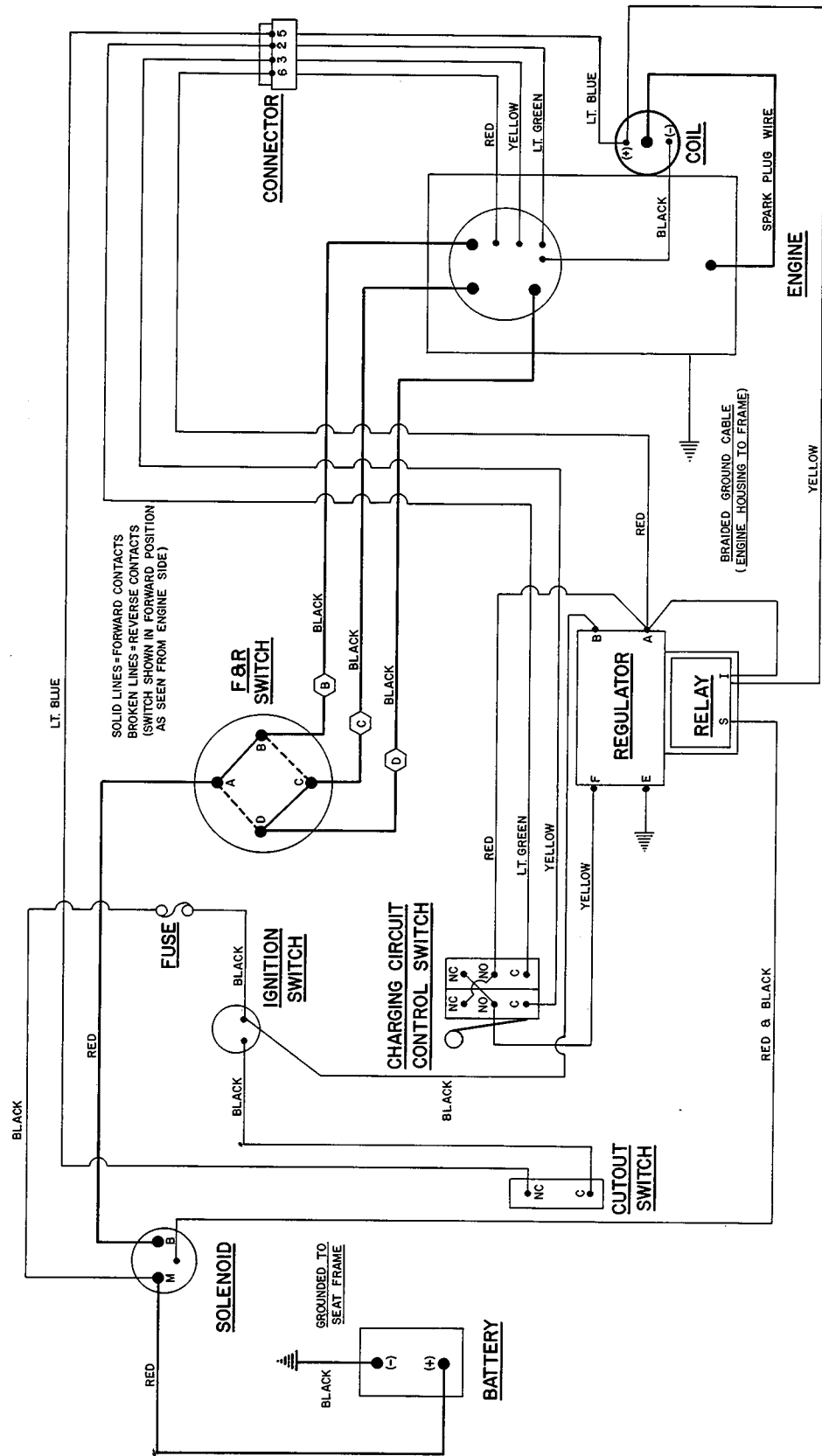


FIG. 2 H CONTROL WIRING DIAGRAM

## Section H

### POINTS AND CONDENSER

#### Removal

Remove four screws securing blower housing (two on each side of engine), loosen two screws securing housing to head shroud (one on each side at top), and remove housing. Bend locking tabs away from bolt securing flywheel to shaft.

Remove flywheel, (See Fig. 3 H). Special puller, Part Number A-14709-G1 is available through E-Z-GO Service Parts.

Referring to Fig 4 H, remove nut (1) securing condenser lead and ignition lead to points, remove screw securing points to timing plate, remove retaining clip and remove points. **NOTE:** Do not remove screws (2) securing timing plate. Remove screws securing condenser and remove condenser.

When installing new points and condenser, be certain ignition leads and oiler are positioned correctly. Reinstall flywheel and torque draw bolt to 20-24 ft. lbs. Bend locking tabs against flats on bolt.

#### Breaker Points Adjustment

Remove two screws securing access cover to flywheel and remove cover.

Rotate flywheel until points and retaining screw are visible through slots. Loosen screw and adjust gap (use feeler gauge) to .015 inch for new points or .013 inch for used points. To assure accurate setting after adjusting try a gauge .001 inch larger and then a gauge .001 inch smaller to double check the adjustment. Improper use of the feeler gauge is the most common error made.

**NOTE:** New points Cam Contact Surface will wear rapidly for the first four hours of operation. This is the reason for setting new points .002 inch wider.

### BRUSHES

#### Removal

To gain access to the brushes, refer to Points and Condenser Removal. Remove screw retaining each brush lead, push spring clear and slide brush out.

### SPARK PLUG

Before removing plug, all dust and foreign matter should be blown from base. See Trouble Shooting section for cause of plug fouling.

Clean fouled plug and regap to .028-.030 inch. Use wire type gauge for checking electrode gap. Install and torque to 18-21 ft. lbs.

If new plug is required use one of the following only. NGK-B6HS or Champion L86, or AC 44FF.

### STARTER-DYNAMO

If disassembly of this unit is required refer to Engine Disassembly.

### ACCELERATOR CONTROLLED CUTOUT SWITCH

Adjustment (Refer to Control Linkages Section "D", Fig. 3 D).

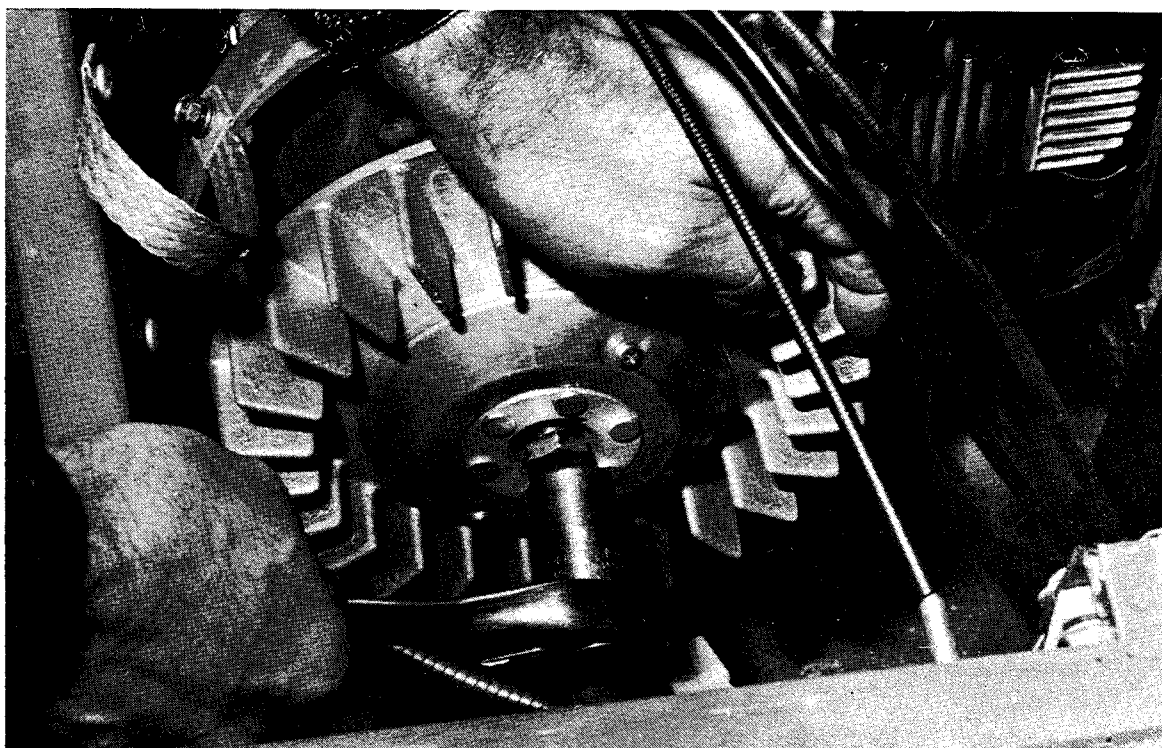


FIG. 3 H

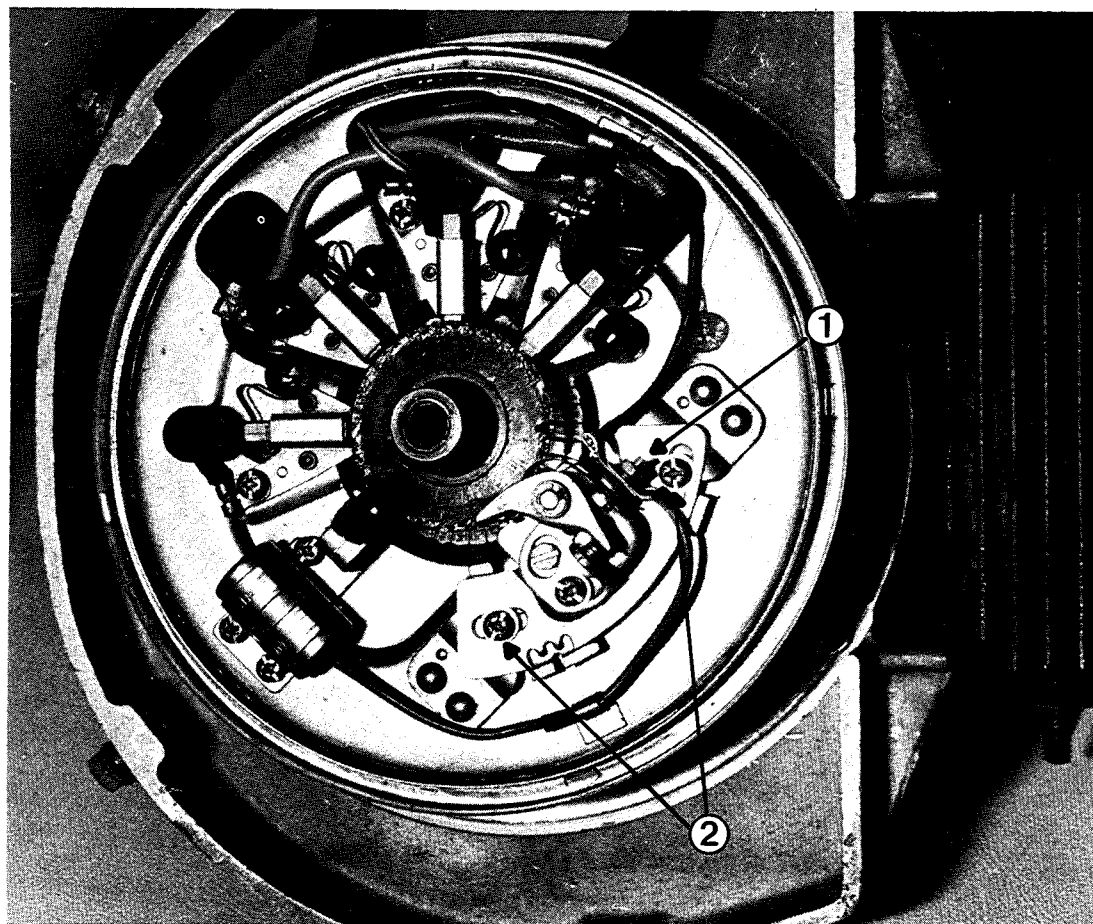


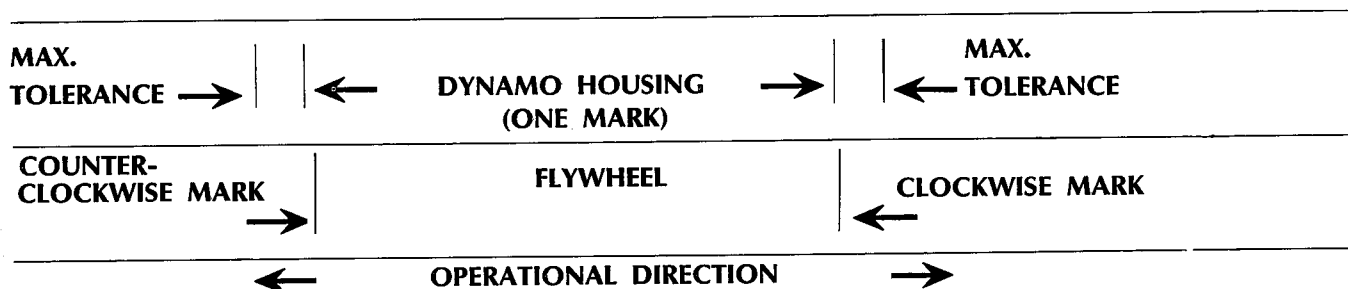
FIG. 4 H

## Section H

### TIMING PROCEDURE

1. To gain access to timing marks and adjusting plate the blower housing must be removed. (Refer to points and condenser removal this section).
2. Remove two screws retaining dust cover to flywheel. This will expose two slots for access to points and timing adjustment plate.
3. Remove black primary wire from the negative (—) side of the ignition coil and attach suitable timing buzzer, light, or Ohm meter.
4. Rotate the flywheel clockwise until the leading timing mark (furthest clockwise mark) in the flywheel lines up with the mark on the top of the dynamo housing. The points should open at this moment and the timing device should indicate. Note the amount of error between marks and the actual indication for clockwise operation.
5. Rotate the flywheel counter-clockwise. Note the error between the leading timing mark (furthest counter-clockwise mark) and the mark on the top of the dynamo housing.
6. Loosen the two screws that secure the timing adjusting plate. Move the adjusting plate so that the timing indicator responds as close as possible to each of the two timing marks. Any error should be divided equally.

Maximum tolerance allowance for used points — on the mark to 1/8" advance each direction of engine operation and for new points — 1/16" advance to 3/16" advance each direction of engine operation.



**BATTERY SERVICE**

For maximum efficiency and longest useful battery life, prompt and correct service must be provided.

Keep battery clean and dry on top to avoid electrical leakage over top to carrier case or hold down.

Wash the top of battery making sure the vent caps are in place. Do not allow water or other foreign matter to enter cells. Use a solution of bicarbonate of soda and water to wash battery if there is an accumulation of acid. (Approx. 1 cup of bicarbonate of soda per bucket of water.)

Inspect battery and other terminal connections for:

1. **Corrosion** — If any exists, clean connection, reinstall, and apply a non-metallic grease or protective spray to retard further corrosion.
2. **Loose connections** — Be sure all connections are tight and that good contact is made between terminals.
3. **Broken or Frayed Cables** — Be sure all connections are good and that no loose or broken wires are exposed. Replace as necessary.
4. After car has been used, if battery terminal connections are warm or hot, remove, clean, tighten firmly and apply a non-metallic grease.

Check electrolyte level at least once a week to assure electrolyte is above separators. Excess water usage indicates the presence of any one or all of the following conditions which should be checked.

1. Overcharging
2. High temperature operation
3. Nearing end of service life

Do not allow the electrolyte level to drop below top of separators since this will lead to shortened battery life.

Do not add water to battery until it is fully charged, unless the electrolyte level is below top of separators. If so, add only enough water to cover separators.

Add only approved water to the cells. Distilled water is recommended, high mineral content water must not be used. Maximum allowable impurities in percent-iron (.003), chloride (.004), fixed residue (.075).

**WARNING:**

Overfilling the cells when adding water weakens the solution due to siphoning action or bubbling. Each time this happens the solution strength is weakened by adding too much water. Loss of ampere hour capacity and short life will be encountered due to low Sp. Gr. reading.

Fill to within 1/8" below bottom of chamber in vent hole well in cover. Never add acid to a battery. Do not use a hose to add water to battery.

If battery seems to be weak when starting engine, make the following checks with hydrometer or voltmeter.

Discharged, or less than 1/2 charged batteries (1.210 gravity) must be recharged to have charge sufficient for testing.

**\*Open Circuit Voltage Test**

The car must stand idle for at least (5) five minutes before testing with open circuit voltmeter. A variation of .05 volts on open circuit voltmeter indicates trouble. If a variation between batteries or cells is noticed, the battery should be charged to a full charge and then tested on closed circuit as explained in the following procedure.

## Section H

Open circuit voltage in relation to percentage of charge is as follows:

Sp. Gr.	Open Circuit Volts	% Charge
1.280	2.13	100%
1.240	2.09	75%
1.200	2.05	50%
1.150	2.00	25%

There are voltmeters designed to read open circuit voltages in comparison to Sp. Gr.

### \*Closed Circuit Voltage Test

The battery should be fully charged. Connect a resistance load of approximately 200 amperes on battery. Each cell should test the same at end of 30 seconds. A difference of 0.15 volts between batteries or cells indicates battery is not fit for service.

**\*Note:-** To make this test on the new plastic top batteries, voltage must be checked across total cells, (Positive to Negative), and then compared to a battery which is known to be good.

### Instructions for using Hydrometer

1. Draw a minimum of solution into the test tube so that float is floating free and not resting against top or bottom.
2. Hold hydrometer in a vertical position and take reading at eye level.
3. Always correct hydrometer Specific Gravity reading to 80° F. For each ten degrees temperature above 80° F., add 4 points to reading. Example: 90° F. 1.250 Sp. Gr. = 1.254. For each ten degrees below 80° F., subtract 4 points from reading. Example: 70° F. 1.250 Sp. Gr. = 1.246.
4. Test each cell, record readings (corrected to 80° F.). A variation of 50 points between any two cell readings (Example 1.250 — 1.200) indicates trouble in low cells.

### Instructions for Charging

Be sure charger voltage output is set to correspond with voltage of batteries to be charged.

Following chart gives hours of charge required in relation to specific gravity corrected at 80°F.

Percentage of Charge	Sp. Gr. Corrected at 80° F.	Hours Chg. at 5 Amps	Hours Chg. at 10 Amps	Hours Chg. at 20 Amps
100%	1.280	0	0	0
	1.270	2½	1¼	0 2/3
	1.260	5	2½	1¼
	1.250	7½	3¾	1¾
75%	1.240	10	5	2½
	1.230	12¼	6	3
	1.220	14½	7¼	3¾
	1.210	16¾	8½	4¼
50%	1.200	19	9½	4¾
	1.190	21	10½	5¼
	1.180	23½	11¾	6
	1.170	26	13	6½
25%	1.160	28½	14¼	7
	1.150	31	15½	7¾
	1.140	33½	16¾	8¼
	1.130	36	18	9
0%	1.120	38½	19¼	9¾
	1.110	40	20	10

When automatic charger is used with time clock, check the Specific Gravity, correct to 80° F., then set time clock to hours in relation to Specific Gravity.

**WARNING!** Hydrogen gas, formed when charging, is explosive. Avoid electrical spark or open flame near batteries. To avoid accumulation of gas under car seat, lift seat to open position while charging.

If temperature of battery or outside temperature is below 60° F. the capacity of the battery will be less. They will require more hours of charge if below 60° F., as the colder they are the faster they will build up in voltage and reduce the charging rate.

### **Do Not Overcharge Battery**

During charge, if temperature reaches 125° F., the charge rate must be reduced or battery taken off charge and allowed to cool down to room temperature.

Before being placed in service, new batteries or batteries that have been stored must be fully charged.

### **Storage**

Batteries that are removed from service for storage during winter or slow months must be cared for as follows: Fully charged. Place in a cool place, not below 32° F. or above 80° F. if possible.

Solution will freeze at following temperatures:

1.250 Sp. Gr. 62° F. — Below Zero

1.200 Sp. Gr. 16° F. — Below Zero

1.150 Sp. Gr. 5° F. + Above Zero

1.100 Sp. Gr. 19° F. + Above Zero

Batteries self-discharge when idle as follows:

At 100° F. Batt. Self-Discharges 3 Pts. in Gr. Per Day

At 80° F. Batt. Self-Discharges 2 Pts. in Gr. Per Day

At 50° F. Batt. Self-Discharges 1/2 Pts. in Gr. Per Day

At 30° F. Batt. Self-Discharges 1/10 Pts. in Gr. Per Day

Batteries should be charged every 30 days or when Sp. Gr. drops to 1.210 Sp. Gr. corrected at 80°F.

If trouble is encountered in bringing batteries to full charge, line voltage may be below 115 volts. Contact the power company or an electrician and have line voltage checked.







Polaris E-Z-Go  
Division of Textron Inc.

# SERVICE MANUAL

## CARBURETOR AND FUEL SYSTEM

MODEL  
GASOLINE  
SECTION J

### GENERAL

The golf car is equipped with a Mikuni BV type carburetor and a fuel pump. Cars manufactured from Feb. 23, 1976 to Oct. 3, 1977 (serial nos. 104768 thru 137704) are equipped with a model BV-24 (24mm) carburetor. Cars manufactured on and after Oct. 4, 1977 (serial no. 137705 and subsequent) are equipped with a model BV-18 (18mm) carburetor. The operational characteristics and repair procedures are the same for both carburetors, unless noted "for model BV-18," or "for model BV-24."

### CARBURETOR OPERATION

The carburetor is constructed with four different systems: the float system, the pilot system, the main system, and the choke system (see fig. 1J and 2J). The Mikuni carburetor is equipped with fixed jets and requires no adjustment.

#### Float System

The Float chamber is located directly on the underside of the carburetor, and the fuel is kept at the standard level by means of the float and the needle valve.

As the fuel flows from the fuel pump to the float chamber through the needle valve and fills the fixed volume chamber, the float rises, and when the buoyancy of the float is balanced with the fuel pressure the needle valve is closed to keep the standard fuel level.

#### Pilot System

The pilot system functions to deliver fuel during low speed operation. The fuel supplied through the main jet is measured by the pilot jet, mixed with the air measured by the pilot air jet, controlled by the pilot screw and delivered to the engine through the pilot outlet and the by-pass.

#### Main System

The main system functions to deliver the fuel during acceleration and during heavy load conditions. The fuel is measured by the main nozzle. The air measured by the main air jet is mixed with the fuel through the bleed opening of the main nozzle, jetted through the main bore as atomized fuel, and mixed again with intake air to become the most suitable concentration of a mixture for delivering to the engine. See Carburetor Main Jets, p. J9 for High Altitude jetting charts.

#### Choke System

The choke system functions to make initial starting of the engine easy in cold weather. When the engine turns with the choke closed, the negative pressure of the main nozzle increases to draw a larger proportion of fuel and make initial starting easy.

#### Carburetor Service

Before servicing the carburetor and fuel system, be sure ignition circuit and components are in proper operating condition.

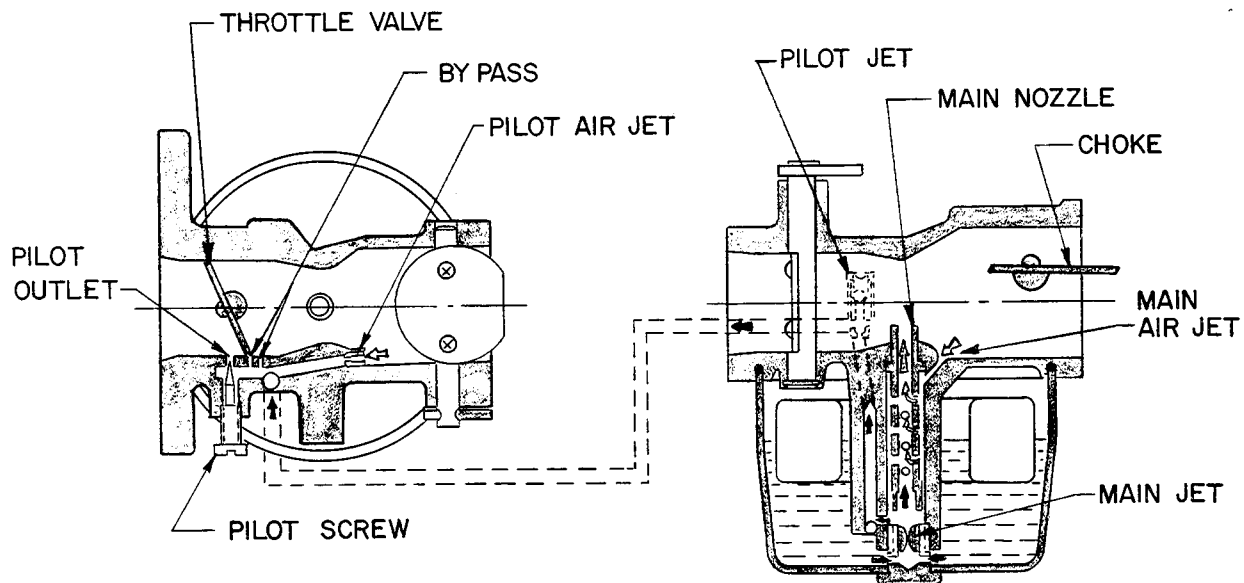


FIG. 1 J

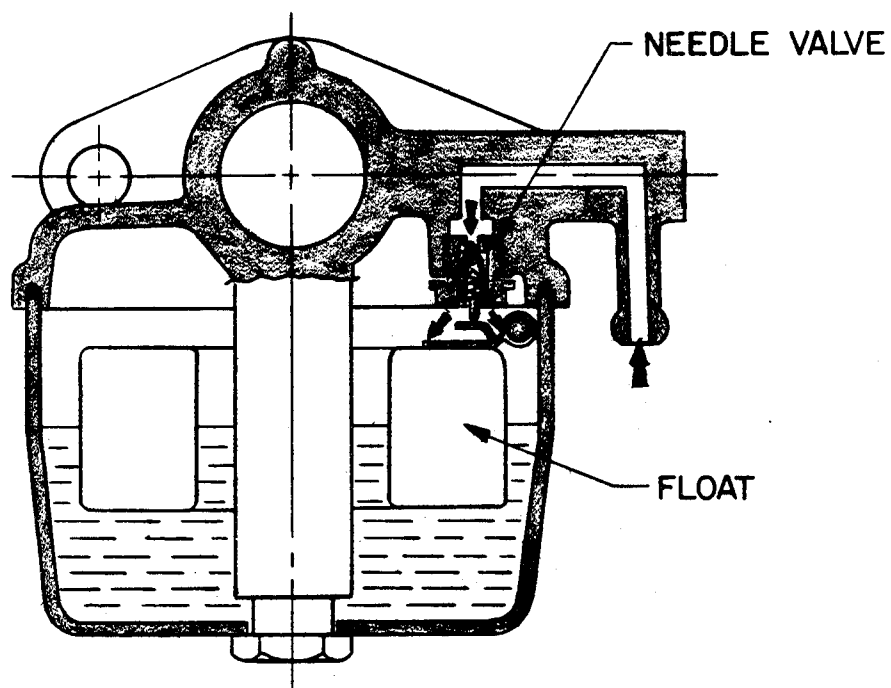


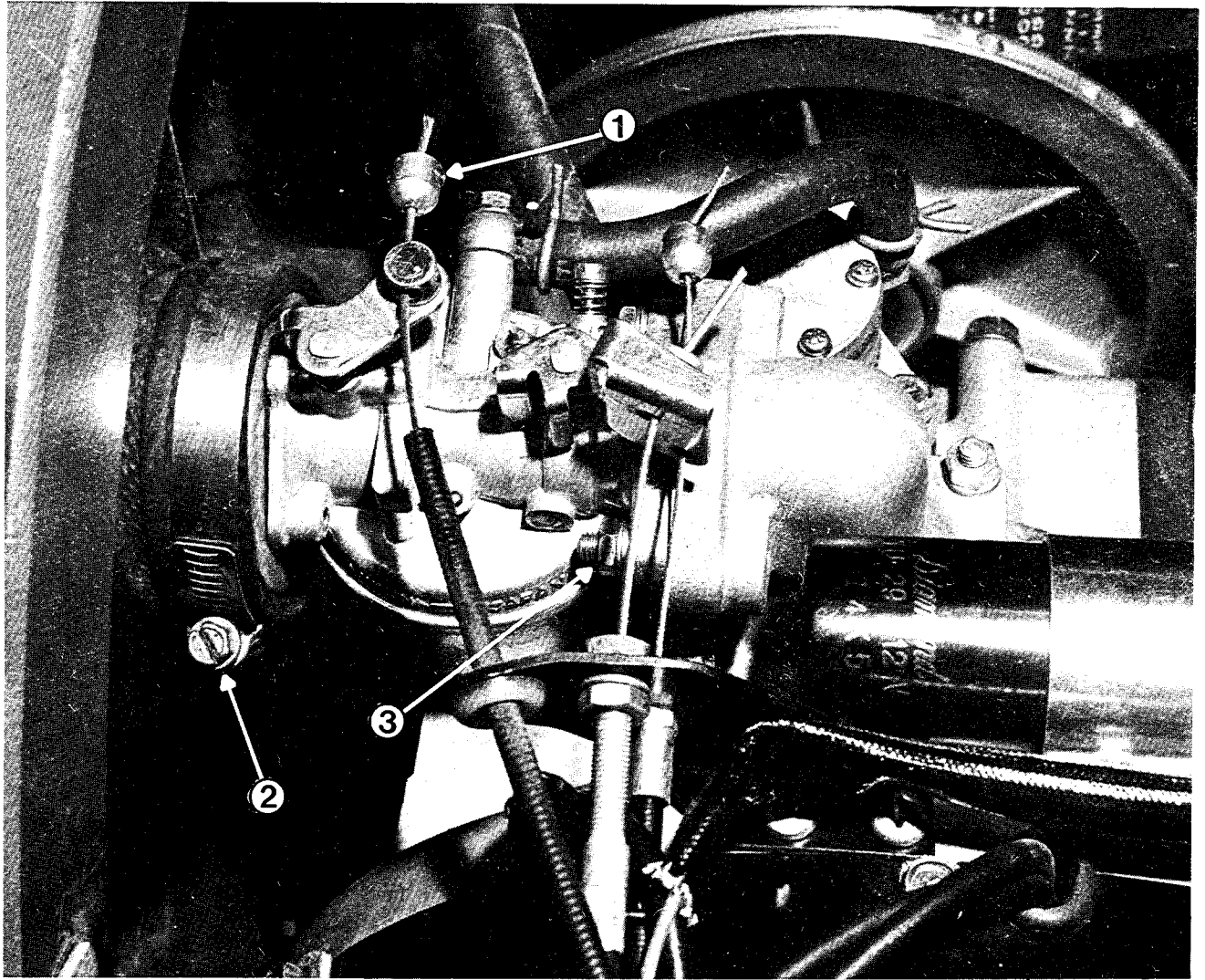
FIG. 2 J

TYPICAL FOR BV-18 & BV-24

**REMOVAL FROM ENGINE (See Fig. 3 J)**

Disconnect fuel line from fuel pump. Disconnect throttle, choke and governor cables by loosening set screw (1) and sliding cable clamps from cable. Disconnect air inlet hose by loosening clamp (2). Remove two nuts and washers (3) and slide carburetor off.

On BV-18 model carburetors, back off on set screw in choke lever, or remove clamps as above, remove nut on cable housing at bracket and move choke cable to one side to prevent damage.

**FIG. 3 J****MODEL BV-24 SHOWN**

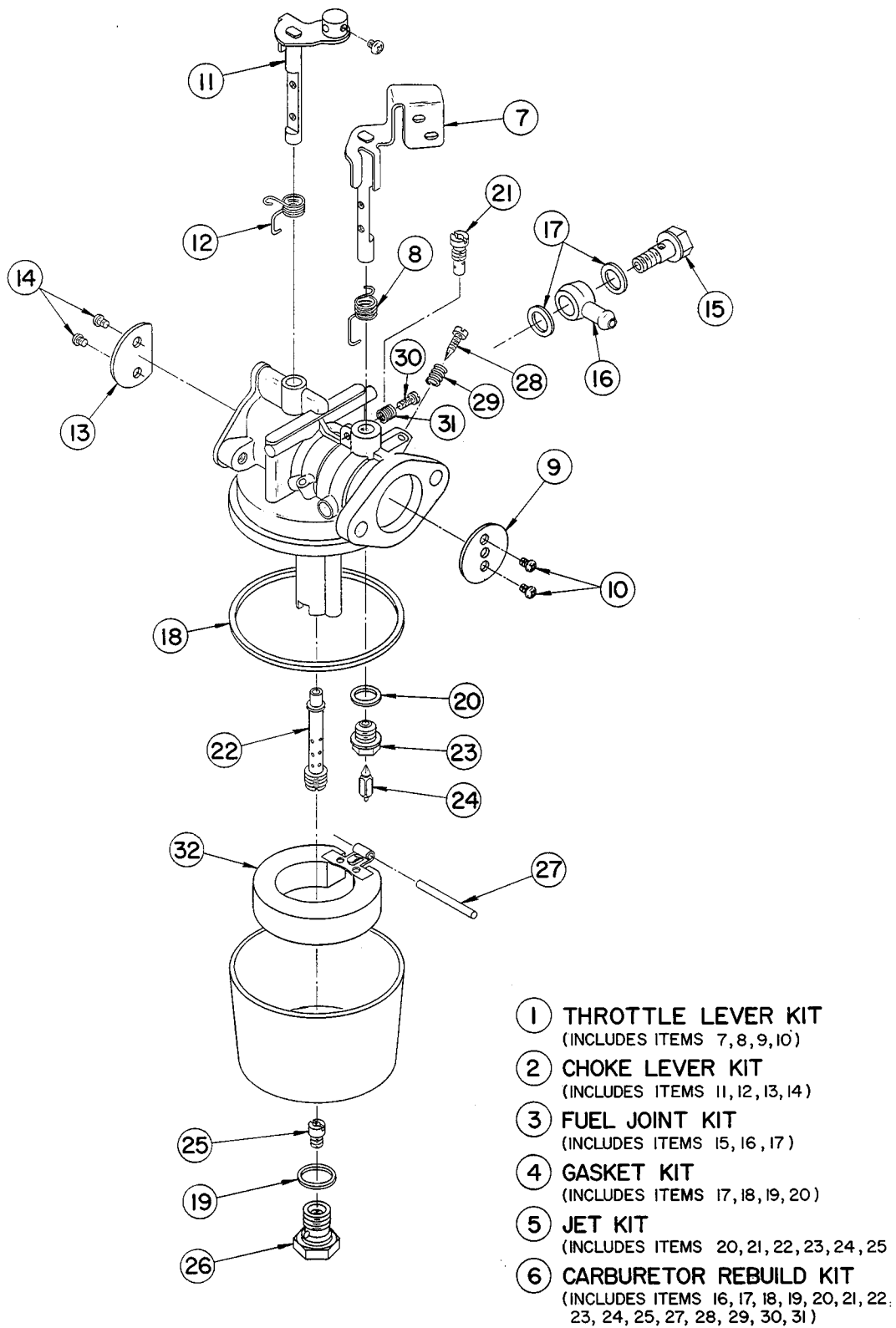


FIG. 4 J

MODEL BV-24

Revised 2/78

**CARBURETOR DISASSEMBLY Model BV-24 (See Fig. 4 J)**

Before disassembling carburetor, clean the outside of the carburetor thoroughly with clean gasoline or solvent. All work should be done on a clean surface. Care should be exercised when disassembling or removing jets. With few mechanical functions in this carburetor, malfunctions are mostly due to wear of parts or clogging by dirt.

Remove the float bowl and main jet (25). Inspect the neoprene "O" ring gasket (18) for nicks or cuts.

Remove the float pin (27) and float (32). **NOTE:** Do not bend the float pin during removal.

Remove the inlet needle (24) and seat (23) inspecting the needle for any wear at its tip.

Remove the main nozzle (22), inspecting holes. Blow clean with compressed air.

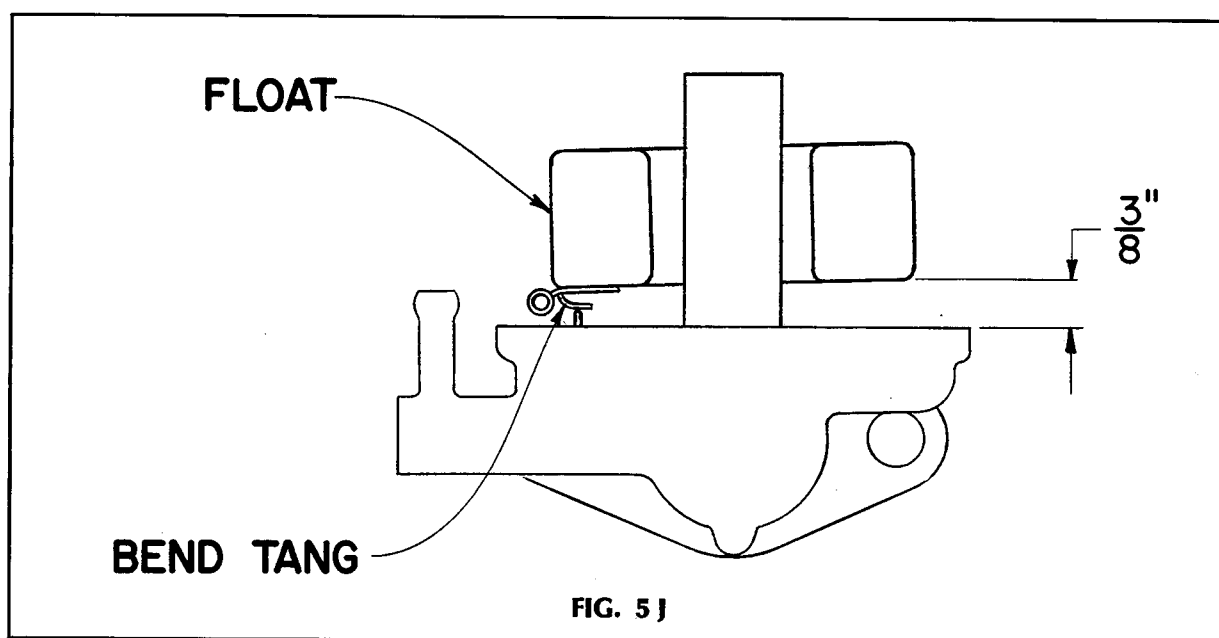
Remove pilot screw (28) and pilot jet (21).

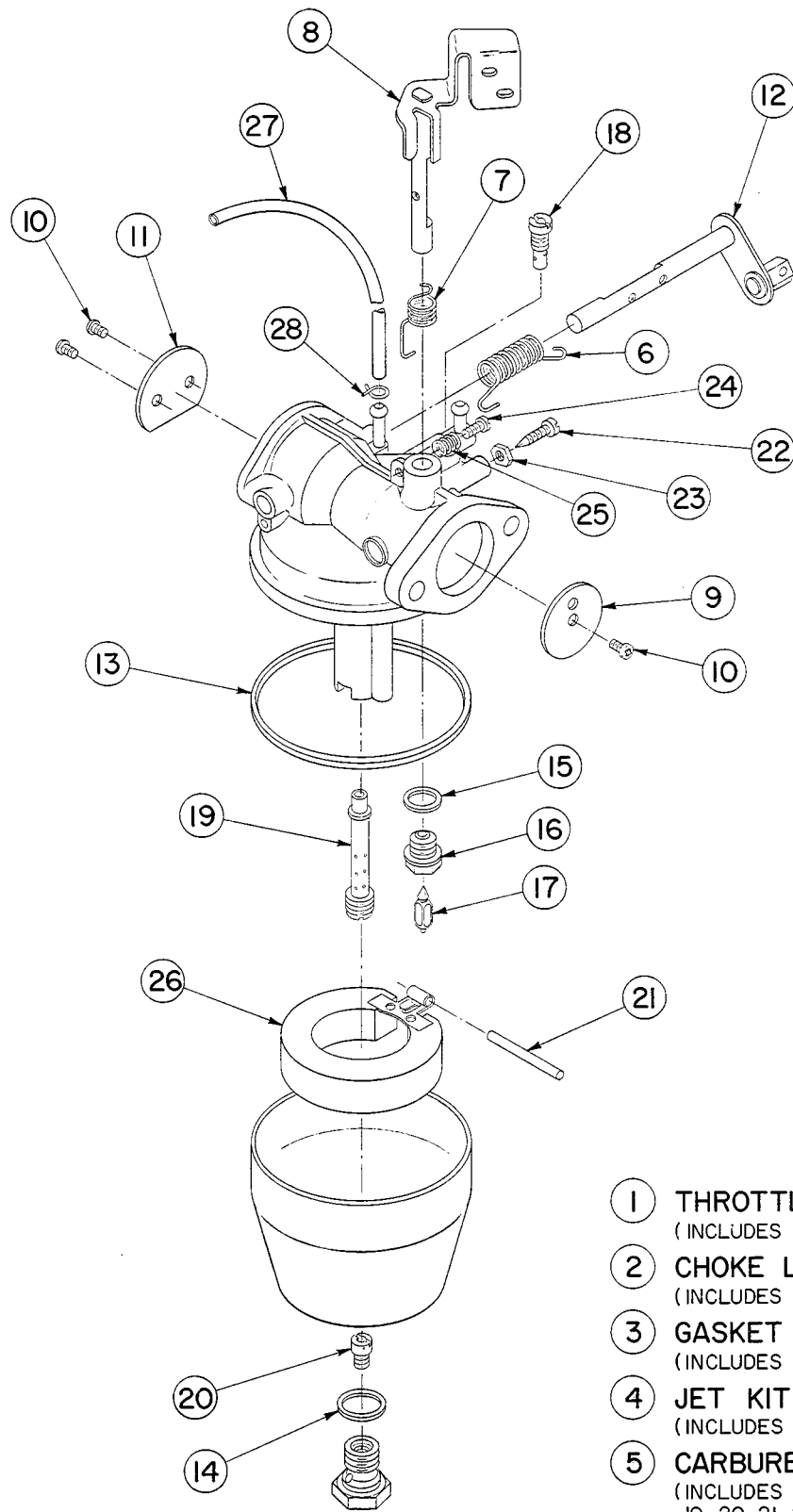
Wash all parts in clean gasoline or solvent and blow all passages and jets with compressed air. Replace all gaskets and parts which show wear or damage.

Adjust the float level before installing the float bowl. With the carburetor in an inverted position, the float should be approximately parallel to, and  $\frac{3}{8}$  inch above, the body on the carburetor as indicated in Fig. 5 J when the tang on the float arm just contacts the inlet needle. **NOTE:** To adjust the float arm never bend the arm itself, always bend the tang which contacts the inlet needle.

After adjusting float level, reassemble carburetor in reverse order of disassembly. Turn pilot screw in to seat, then back out 1 full turn ( $360^\circ$ ).

When reinstalling carburetor to engine, installation of a new gasket is recommended to insure an air tight seal. Make sure fuel lines and air intake hose connections are air tight. Inspect air intake hose for cracks, holes or ruptures and replace if necessary.





- ① THROTTLE LEVER KIT  
(INCLUDES ITEMS 7, 8, 9, 10)
- ② CHOKE LEVER KIT  
(INCLUDES ITEMS 6, 10, 11, 12)
- ③ GASKET KIT  
(INCLUDES ITEMS 13, 14, 15)
- ④ JET KIT  
(INCLUDES ITEMS 15, 16, 17, 18, 19, 20)
- ⑤ CARBURETOR REBUILD KIT  
(INCLUDES ITEMS 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25)

**FIG. 6 J**  
**(MODEL BV-18)**

**CARBURETOR DISASSEMBLY** (Model BV-18 (See Fig. 6 J))

Before disassembling carburetor, clean the outside of the carburetor thoroughly with clean gasoline or solvent. All work should be done on a clean surface. Care should be exercised when disassembling carburetor or removing jets. With few mechanical functions in this carburetor, malfunctions are mostly due to wear of parts or clogging by dirt.

Remove the float bowl and main jet (20). Inspect the neoprene "O" ring gasket (13) for nicks or cuts.

Remove the float pin (21) and float (26). **NOTE:** Do not bend the float pin during removal.

Remove the inlet needle (17) and seat (16) inspecting the needle for any wear at its tip.

Remove the main nozzle (22), inspecting holes. Blow clean with compressed air.

Remove pilot screw (22) and pilot jet (18).

Wash all parts in clean gasoline or solvent and blow all passages and jets with compressed air. Replace all gaskets and parts which show wear or damage.

**FLOAT LEVEL ADJUSTMENT** Model BV-18 (See fig. 7 J)

To adjust float level, install new needle and seat or reinstall old parts if in good condition. Reinstall float and float pin. Turn carburetor on side so the weight of the float is not resting on needle. This position will allow float to pivot freely without depressing spring loaded needle with its' weight. (**NOTE:** When adjusting float, never bend float arm, always bend tangs 1 or 2).

The float level should be set to .040" to .119" (1mm to 3mm) from bottom of float to carburetor body. With the float set to this dimension, tang 1 must just **touch** needle and tang 2 must not touch carburetor body or needle seat. (See "A", free position, fig 7J). After float level is set in free position, compress needle by pushing float gently toward carburetor body. In this position tang 1 should partially compress needle before tang 2 touches carburetor body. (See "B", compressed position, fig. 7J). After checking compressed position, check low fuel position by gently lifting float away from carburetor body. In this position, tang 1 must be raised off of needle before tang 2 touches needle seat. (See "C", low fuel position, fig. 7J). After "B" and "C" have been checked, return to "A" and recheck before assembling carburetor.

After adjusting float level, reassemble carburetor in reverse order of disassembly. Turn pilot screw in to seat, then back out 1 full turn (360°).

When reassembling air intake adapter to choke side of carburetor, reinstall washers under head of screws to prevent screws from restricting choke shaft movement. Check for free movement of choke shaft and butterfly after air cleaner adapter is installed and before carburetor is installed on engine.

When reinstalling carburetor to engine, installation of a new gasket is recommended to insure an air tight seal. Make sure fuel lines and air intake hose connections are air tight. Inspect air intake hose for cracks, holes or ruptures and replace if necessary.

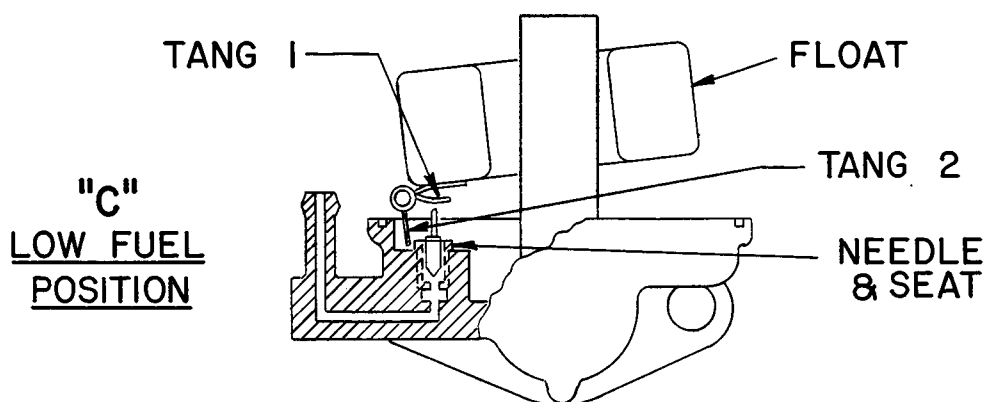
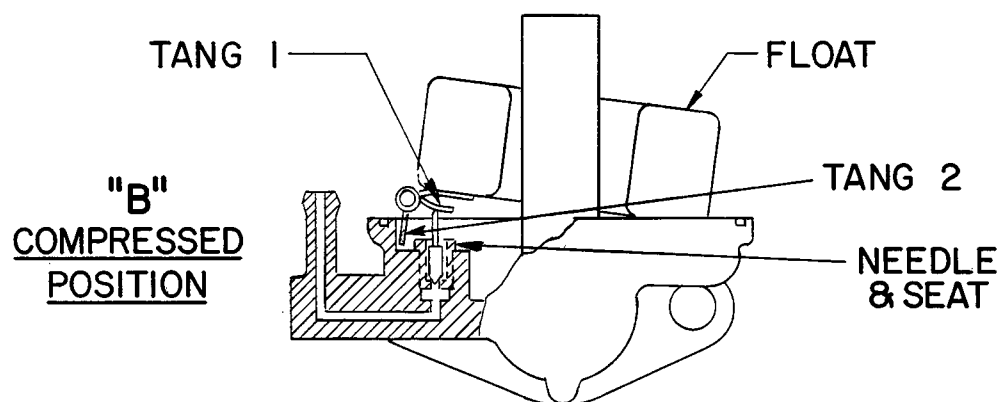
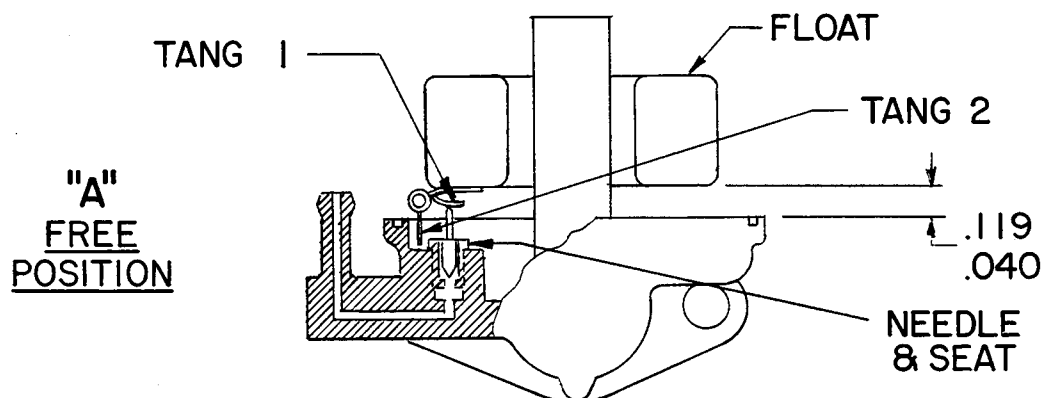


FIG. 7 J  
(MODEL BV-18)



**CARBURETOR MAIN JETS**

The size of the main jet used in the golf car carburetor is dependent to a large degree on the altitude and the temperature at which the car is to be operated.

The following jet size charts are intended for use as a guide for re-jetting the carburetor as necessary for optimum performance of your E-Z-GO car.

**MAIN JET SIZE VS. ALTITUDE AND TEMPERATURE (Model BV-24 Carburetor)**

Production Settings:

#92.5 Main Jet

#50.0 Pilot Jet

When selecting the main jet size, use the coolest temperature and the lowest altitude at which the car will be operated.

For extremely hilly terrain, hauling heavy loads, or long sustained runs, use one (1) jet size larger than the recommended jet.

		TEMPERATURE - DEGREES F						
		40	50	60	70	80	90	100
ALTITUDE - FEET	0	95	95	95	92.5	92.5	92.5	90
	1000	95	92.5	92.5	92.5	92.5	90	90
	2000	92.5	92.5	92.5	90	90	90	87.5
	3000	92.5	90	90	90	87.5	87.5	87.5
	4000	90	90	87.5	87.5	87.5	85	85
	5000	87.5	87.5	87.5	85	85	85	85
	6000	87.5	87.5	85	85	85	82.5	82.5
	7000	85	85	85	82.5	82.5	82.5	80

**MAIN JET SIZE VS. ALTITUDE AND TEMPERATURE (Model BV-18 Carburetor)**

Production Settings:

#87.5 Main Jet

#50.0 Pilot Jet

When selecting the main jet size, use the coolest temperature and the lowest altitude at which the car will be operated.

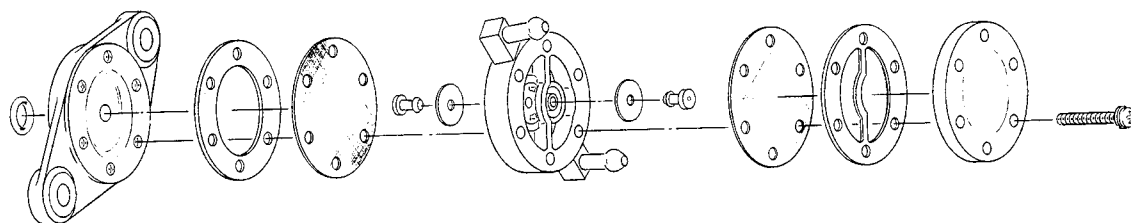
For extremely hilly terrain, hauling heavy loads, or long sustained runs, use one (1) jet size larger than the recommended jet.

		TEMPERATURE - DEGREES F						
		40	50	60	70	80	90	100
ALTITUDE - FEET	0	90	90	87.5	87.5	87.5	87.5	85
	1000	90	87.5	87.5	87.5	85	85	85
	2000	87.5	87.5	87.5	85	85	85	82.5
	3000	87.5	85	85	85	82.5	82.5	82.5
	4000	85	85	85	82.5	82.5	82.5	80
	5000	85	82.5	82.5	82.5	80	80	80
	6000	82.5	82.5	80	80	80	77.5	77.5
	7000	80	80	80	77.5	77.5	77.5	75

## Section J

### FUEL PUMP (See Fig. 6 J)

The fuel pump is mounted directly on the crankcase and is operated by crankcase impulses. As the piston moves up away from the crankcase, a negative pressure draws the diaphragm in the fuel pump toward the engine. This action draws gasoline from the tank into the pump chamber through the inlet valve. This same suction causes the outlet valve to the carburetor to close so fuel will not return from the carburetor. As the piston moves downward toward the crankcase, a positive pressure in the crankcase causes the diaphragm to move in the opposite direction away from the engine. This action forces the inlet valve to close and the outlet valve to the carburetor to open, filling the bowl in the carburetor.



**FUEL PUMP  
FIG. 8 J**

## FUEL TANK AND FILTERS

### Fuel Tank

The fuel tank is located under the trunk lid, in the area immediately behind the seat back supports. The fuel tank is constructed of high density polyethylene and has a capacity of 4 U.S. gallons. Fuel level is gauged by a gauge/cap combination. The gauge is a mechanical float spiral type and has no sending unit. The cap is vented to permit air to bleed into the tank as fuel is used.

If tank removal is necessary, remove trunk lid, drain fuel tank — using a pump or siphon — and remove fuel lines and mounting hardware. Lift tank out through opening where trunk lid was removed. Reinstall in reverse order of removal.

**FUEL LINES AND FILTERS**

Fuel is supplied to the fuel pump and carburetor through flexible fuel hoses. An in-line type filter is installed in the line between the fuel tank and fuel pump, and a second in-line type filter is installed in the line between the fuel pump and the carburetor. Fuel filters, fuel lines and gas tank cap vent should be inspected on a periodic basis for leaks, clogged tank vent, clogged filters, etc. These malfunctions are not only detrimental to the proper operation and performance of the car, but can also be a safety hazard in the case of fuel leaking on a hot engine. Filters should be replaced when necessary, but under no circumstances, should the period of time between filter changes exceed one year.

**CAUTION!** The filter is marked with a flow direction arrow. Make sure arrow points toward fuel pump when installed.

The fuel tank should be drained and cleaned of any sludge or foreign matter after car has been stored for a lengthy period.

**CAUTION!** Do not attempt to repair a damaged or leaking fuel tank, it should be replaced.

**CARBURETOR TROUBLE SHOOTING**

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>
Engine runs, but overloads with fuel . . . .	Choke is partially closed Fuel pump diaphragm ruptured (caused by engine backfire ) Needle and seat not seating properly Incorrect float level (too high) Air filter clogged Main air jet clogged Pilot air jet clogged
Engine will not accelerate . . . .	Clogged fuel filter Clogged main jet Restricted fuel flow Air filter clogged Throttle lever restriction Throttle lever spring Incorrect float level (too low)
Engine will not run at low speed	Incorrect air mixture setting Throttle stop screw incorrectly adjusted Dirt in pilot-jet
Engine runs lean . . . .	Tank vent plugged Leak in fuel line between tank and carburetor Main jet plugged Incorrect float level (too low) Pilot jet plugged



## **GENERAL**

The two clutch assemblies perform as an automatic torque converter. (Variable ratio drive). This drive system consists of a centrifugal member (Drive Clutch), a torque member (Driven Clutch), and drive belt. When the throttle is advanced, and the engine speed is increased, the movable flange of the centrifugal member (Mounted on engine shaft) is moved in to engage the drive belt by centrifugal force applied to cams operating in the movable flange housing. When throttle is closed, the engine slows down, reducing force on the cams, allowing the flanges to separate from spring pressure on the movable flange. At idle speed, the belt rides down at the bottom of the flanges on the clutch shaft so that the drive is disengaged. As engine speed is increased, the movable flange will move in against the belt, thus engaging the belt between the two clutch flanges. At this point the drive is at maximum ratio, with increasing engine speeds, the movable flange is forced toward the fixed flange, increasing the belt pitch diameter, which decreases the ratio, shifting the drive for higher speeds.

The torque member (Driven Clutch) is a torque-responsive variable pitch sheave which maintains an equilibrium condition with the centrifugal member at all speeds. Flange pressure varies directly with torque so that the drive "down-shifts" its ratio with increased torque demand without change of engine speed. The sliding flange spiral ramp and followers are activated by belt friction. The spring is used to assure constant belt contact under all operating conditions.

### **DRIVE BELT**

#### **Removing Belt**

**CAUTION:** Do not remove Drive Belt when engine is Hot.

Pull up on belt and rotate the movable flange of driven clutch (mounted on differential pinion) backwards to spread; then roll belt over the movable flange.

#### **Belt Service**

The belt should not require any service except when the car has been operated in an extremely dusty or muddy area. In such case it should be washed with water.

If belt is frayed, or badly worn it should be replaced.

## Section K

### DRIVE CLUTCH

**IMPORTANT!** All drive clutches are "certified balanced and tested". The clutch must not be disassembled for repairs in the field. Therefore, the factory has instituted a service policy of EXCHANGE ONLY. This means that should a Drive Clutch become inoperative, for any reason, the complete assembly is to be replaced.

#### Drive Clutch Removal

Remove drive belt. (Refer to Belt Removal Procedure). Remove draw bolt and washers from shaft end. Install clutch puller (Part Number A-12580-G1) and turn clockwise to force clutch off. Squeeze faces together and rotate clutch off engine shaft.

#### Drive Clutch Installation

Be sure engine shaft is cleaned of all dirt and foreign matter. Install clutch. Install lock washer, flat washer and plastic bushing on bolt, install bolt and torque to 34-35 ft. lbs.

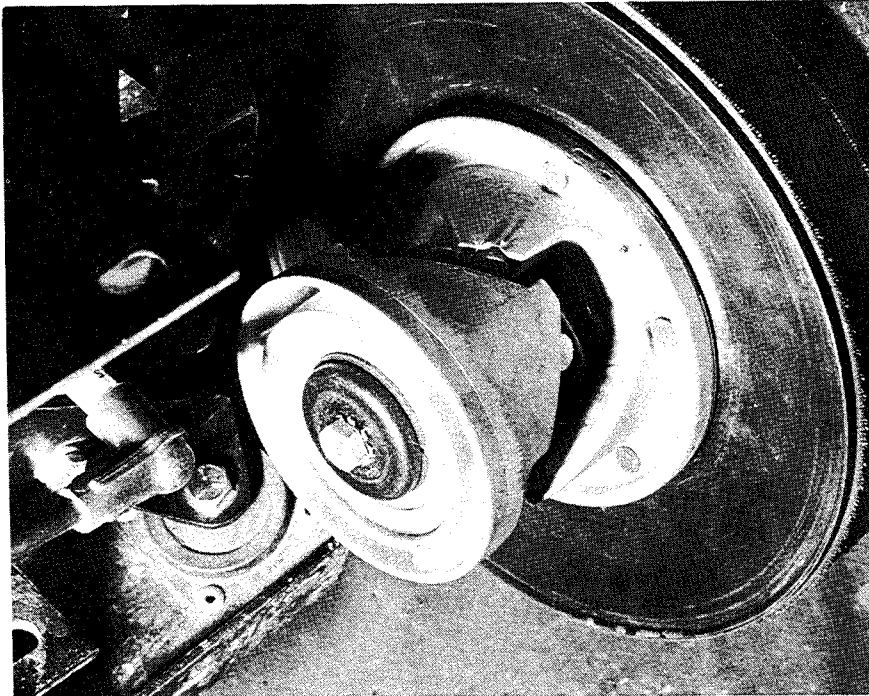
**CAUTION!** Do not install draw bolt with impact tool.

### DRIVEN CLUTCH

The driven clutch assembly may be disassembled for minor field repairs. If the bearing in the movable flange is badly worn it should be replaced. (See Bushing Replacement Procedure).

#### Driven Clutch Removal (Fig. 1 K)

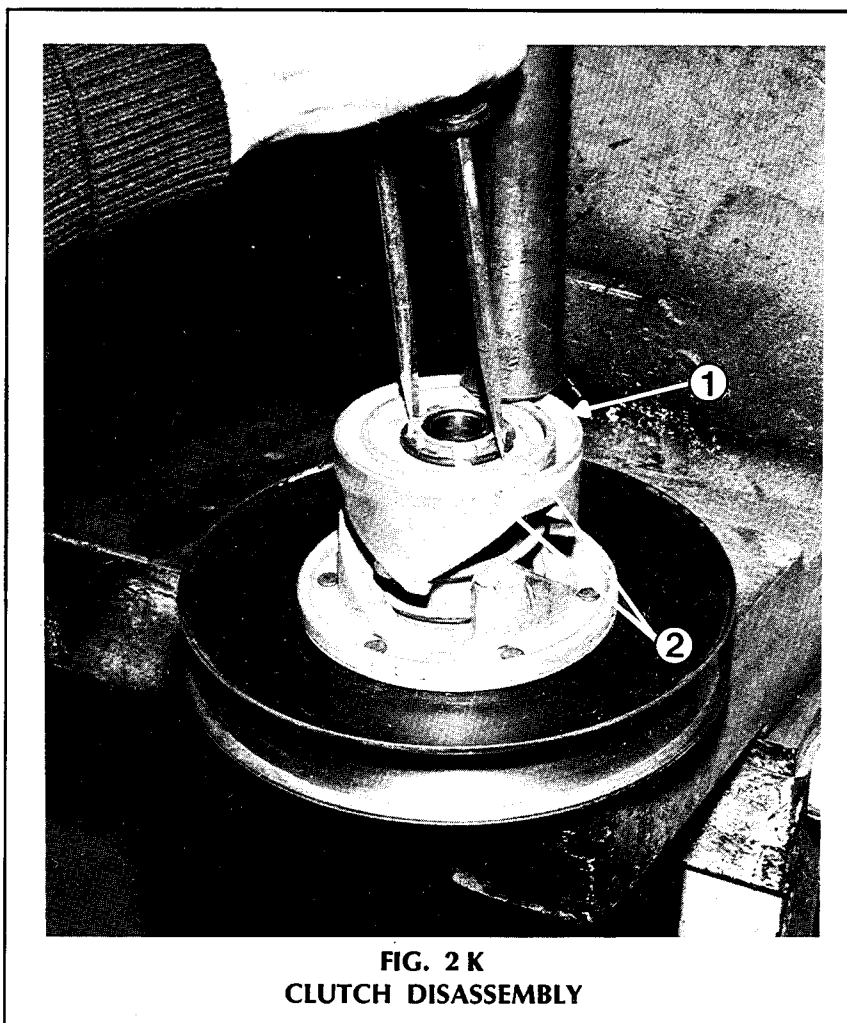
Remove drive belt. (Refer to Belt Removal Procedure). Remove spark plug, driven clutch dust cover and governor assembly. Remove draw bolt and retaining washers, (make note of washer position for reassembly) and slide clutch off. Inspect pinion seal for nicks or cracks. **CAUTION!** Use extreme care not to damage seal surface on back side of clutch.



**FIG. 1 K**  
**DRIVEN CLUTCH REMOVAL**

Place clutch in an arbor press with ramp (1) side up. Apply light pressure with press to free retainer clips (2) and remove clips.

Slowly remove pressure and remove clutch from press. Remove ramp (1), remove spring and lift movable flange from shaft.



#### REPLACING BUSHING (See Fig. 3 K)

Remove two 1/8 inch diameter pins. Care should be exercised in removing pins to not damage holes in movable flange casting. Press out old bushing with arbor press.

Apply Loctite Bearing Retainer No. 601 on outside diameter of bushing.

Press bushing in snug to shoulder. Flange on bushing must be on belt side of casting.

Drill two  $\begin{matrix} +.004 \\ .125 \\ -.000 \end{matrix}$  diameter holes thru bushing using existing holes in casting as a guide.

Drive or press new pins into drilled holes until flush with outside of housing. Remove any burrs from inside of bushing bore. Clean bore of bushing and coat with "Dow Corning" Molycote G Lubricating Paste (or equal) before reassembling clutch.

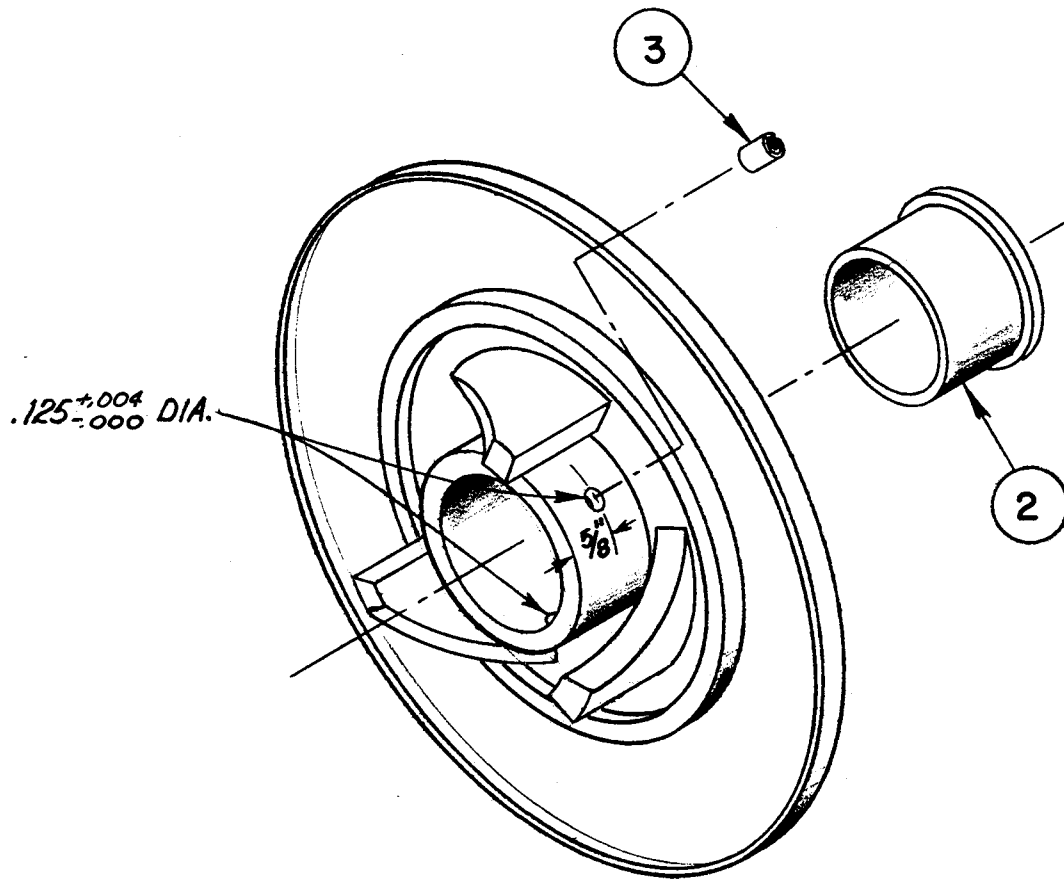


FIG. 3 K  
REPLACING BUSHING

### Replacing Broken Ramp Buttons

To remove, grasp the button with a vise-grip plier and pull with a twisting motion. If button is broken away, use a small drill and carefully drill into the part remaining in ramp. **Note:** Take care not to drill through into ramp casting. Then, using a pick or small screw driver, extract button shank.

Install new button and tap carefully with a mallet or hammer to seat. Be sure button head is seated within recess in ramp casting.

### Reassembly

Reassemble repaired clutch in reverse order of disassembly. Wipe pinion seal with oil, install clutch on shaft, position washers in correct order, (Refer to Fig. 1 K) install draw bolt and torque to 16-20 ft. lbs. Reinstall dust cover and governor assembly. Make sure metal button on governor is centered on plastic dust cover button. Readjust governor. (Refer to Governor Adjustment Section D).

### Storage

If the vehicle is to be out of service for storage during off-season months, remove the drive belt and oil both clutch flange surfaces to prevent rust or corrosion.





Polaris E-Z-Go  
Division of Textron Inc.

# SERVICE MANUAL

## REAR AXLE

MODEL  
GASOLINE  
SECTION L

### GENERAL

The E-Z-GO Golf Car rear axle is a conventional automotive, semi-floating, hypoid gear, carrier-type design. The car is equipped with expanding shoe drum brakes on the rear wheels. Brake service instructions are covered in section 'C' of this manual.

Two types of axle and brake assemblies were used on the E-Z-GO, 244cc gasoline golf cars.

Cars manufactured from February 23, 1976 to March 3, 1977, are equipped with a Dana Corp. type A-12 axle and brake assembly. This type assembly is equipped with a flange hub, formed on the end of the axle shaft and a stamped metal brake drum. (See pages L2 thru L5 for service on A-12 type units)

Cars manufactured from March 4, 1977, and subsequent, are equipped with a Dana Corp type S-12 axle and brake assembly. This type assembly is equipped with a cast iron hub-drum combination (See pages L6 thru L13 for service on S-12 type units)

### Differential Lubrication

Lubricant level should be checked at intervals specified in the Periodic Service Schedule, (Section "B" this manual). With the car on a level surface, lubricant level should be to the bottom level of filler plug hole. When lubricant is low, fill with RPM DELO Multi-Service 200-30 oil. It is not advisable to mix various brands of lubricants. If replacing lubricant with a different brand, it is advisable to flush axle housing with light engine oil. NEVER use kerosene for flushing.

Axle shaft wheel bearings receive their lubrication from grease packed in the bearings when assembled.

### Rear Axle Noise

Rear axle noise may often be confused with other noises in the car. For example, muffler, tires, clutch, drive belt, etc., are all parts that will produce noises similar to those encountered in the axle. Considerable care should be taken in diagnosis of the noises before deciding that it is the axle.

### Axle Adjustments

Considering the precise nature and the special tools required for proper adjustment, the performance of a new axle is seldom if ever improved by re-adjustment in the field, consequently, the practice is discouraged. However, due to conditions beyond normal control, replacing worn or damaged parts, etc., in a few cases will require repair in the field. All repair work to be done on the differential case and drive pinion must be performed by an experienced automotive differential repair shop.

## Section L

### A-12 TYPE - SERVICE

#### Axle Shaft Removal (Fig. 1 L)

Hoist rear of car and place on suitable jack stands or blocks. Remove four lugs securing wheel and remove wheel. After wheel is removed, remove brake drum. Remove brake cable. (Refer to section 'C' this manual).

Remove four backing plate nuts (4) which hold the axle shaft assembly to the axle housing using 1/2" socket. (An opening in the wheel mounting flange permits access for socket).

Remove axle shaft assembly by grasping the brake shoe assembly (7) and plastic dust cover (3) in both hands and carefully pull axle assembly out of axle tube.

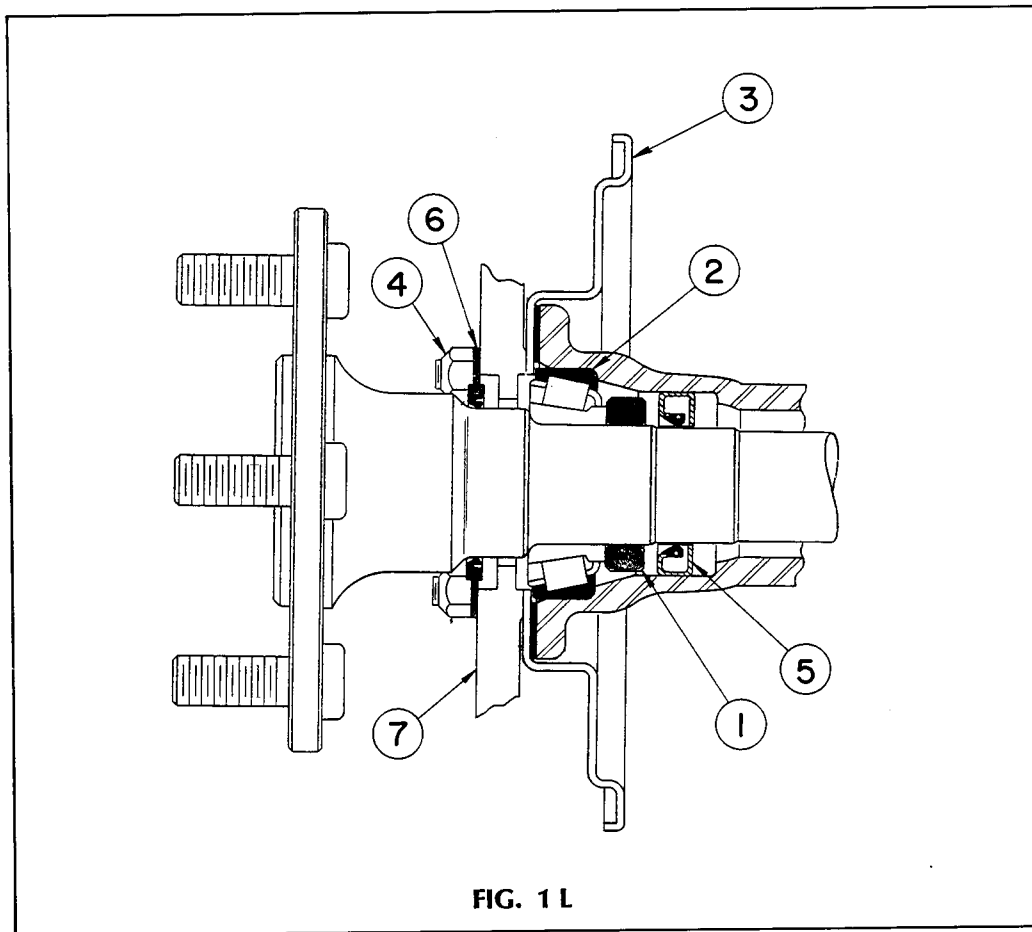


FIG. 1 L

#### Removal of Unit Bearing from Axle Shaft (Fig. 1 L and Fig. 2 L)

Drill 1/4" (approx.) diameter hole in the outside of the retainer ring (1) to a depth approximately 3/4 of the thickness of the ring. **CAUTION!** Drilling completely through the ring could damage the shaft. (Fig. 1 L)

After drilling, position a chisel across the hole and strike sharply to break the ring. (Replace with a new ring at time of reassembly).

Support the axle and brake assembly in a press using two steel bars (1) placed under the brake casting bosses (2) as shown in Fig. 2 L. Two bars must be used to insure even load to both casting bosses. Slowly press shaft down until bearing is removed.

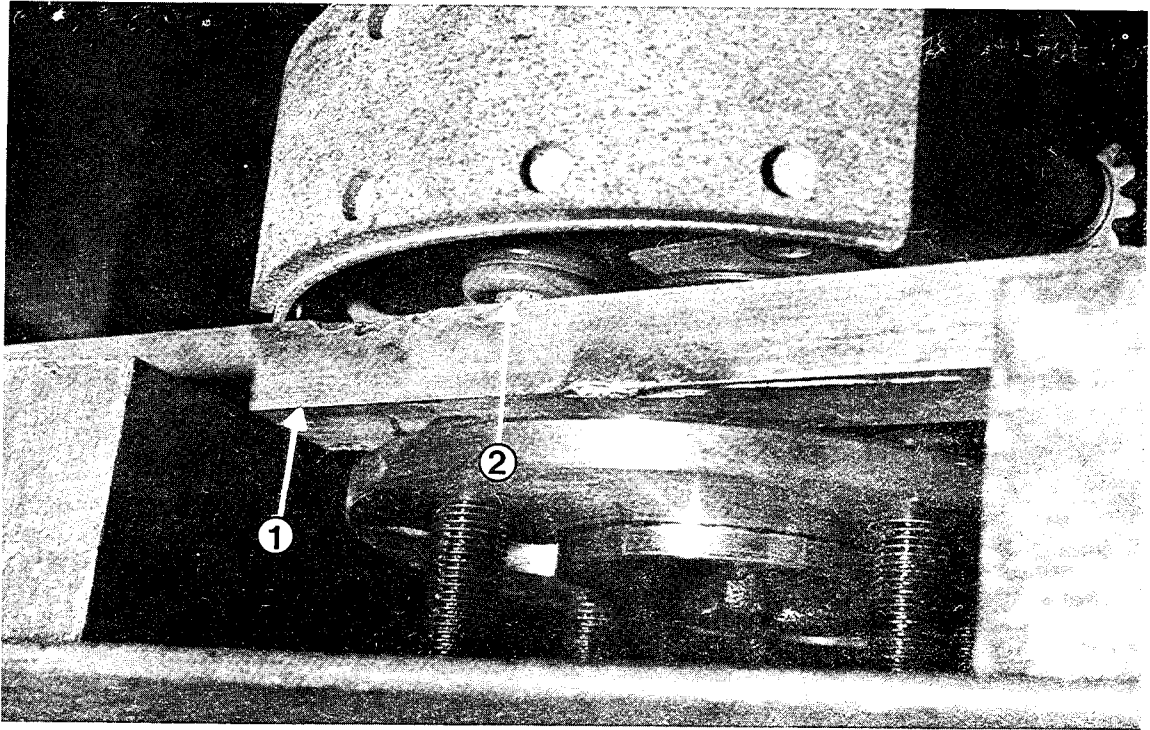


FIG. 2 L

**ASSEMBLING AXLE SHAFT ASSEMBLY (Fig. 3 L)**

Inspect shaft for possible damage. Place grease seal (item 6, Fig. 1 L), brake assembly (item 7, Fig. 1 L), and new bearing (in that order) on axle shaft. Using the discarded retaining ring and two steel bars in an arbor press as shown in Fig. 3 L, press bearing onto the shaft until firmly seated against shaft shoulder. Again using the discarded retaining ring and two steel bars in the arbor press, press on a new retainer ring until seated firmly against bearing.

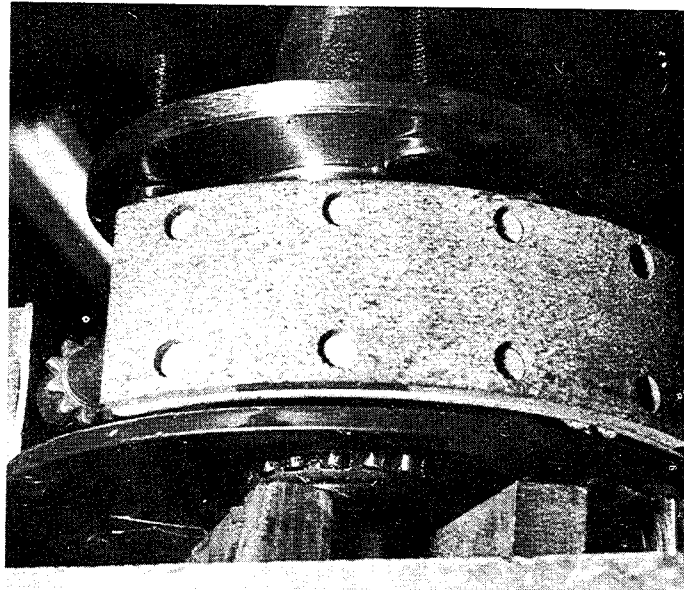


FIG. 3 L

## Section L

### A-12 TYPE - SERVICE

#### Axle Shaft Oil Seal

The axle shaft oil seal (5) (Fig. 1 L) is fitted in the axle housing behind the wheel bearing to prevent differential oil leakage through bearings. It is good practice to replace this seal when axle shaft is removed for bearing service. To replace seal, pry old seal out with a screw driver or pull with seal puller. Install new seal with suitable arbor or by tapping lightly around outer edge with a drift punch. **Note:** Seal must be installed with lip edge to the inside toward differential.

#### INSTALLING AXLE SHAFT

Carefully slide axle shaft assembly through shaft oil seal, align spline into differential side gear and align four bolts in axle housing with four holes in brake casting. Install four backing plate nuts, brake drum and wheel. Adjust brakes per section "C" this manual.

#### DRIVE PINION OIL SEAL REPLACEMENT (Fig. 4 L)

Remove drive belt and driven clutch (refer to Driven Clutch Removal Section "K"). Pry old seal (item 1) out and install new seal with lip toward inside. If proper tool is not available, seal may be installed by tapping lightly around outer edge. Outside edge of seal must be flush with casting surface (item 2). Wipe seal surface with oil before installing driven clutch. Inspect driven clutch seal surface (item 3) for nicks or wear. Reassemble driven clutch to axle using care not to damage seal.

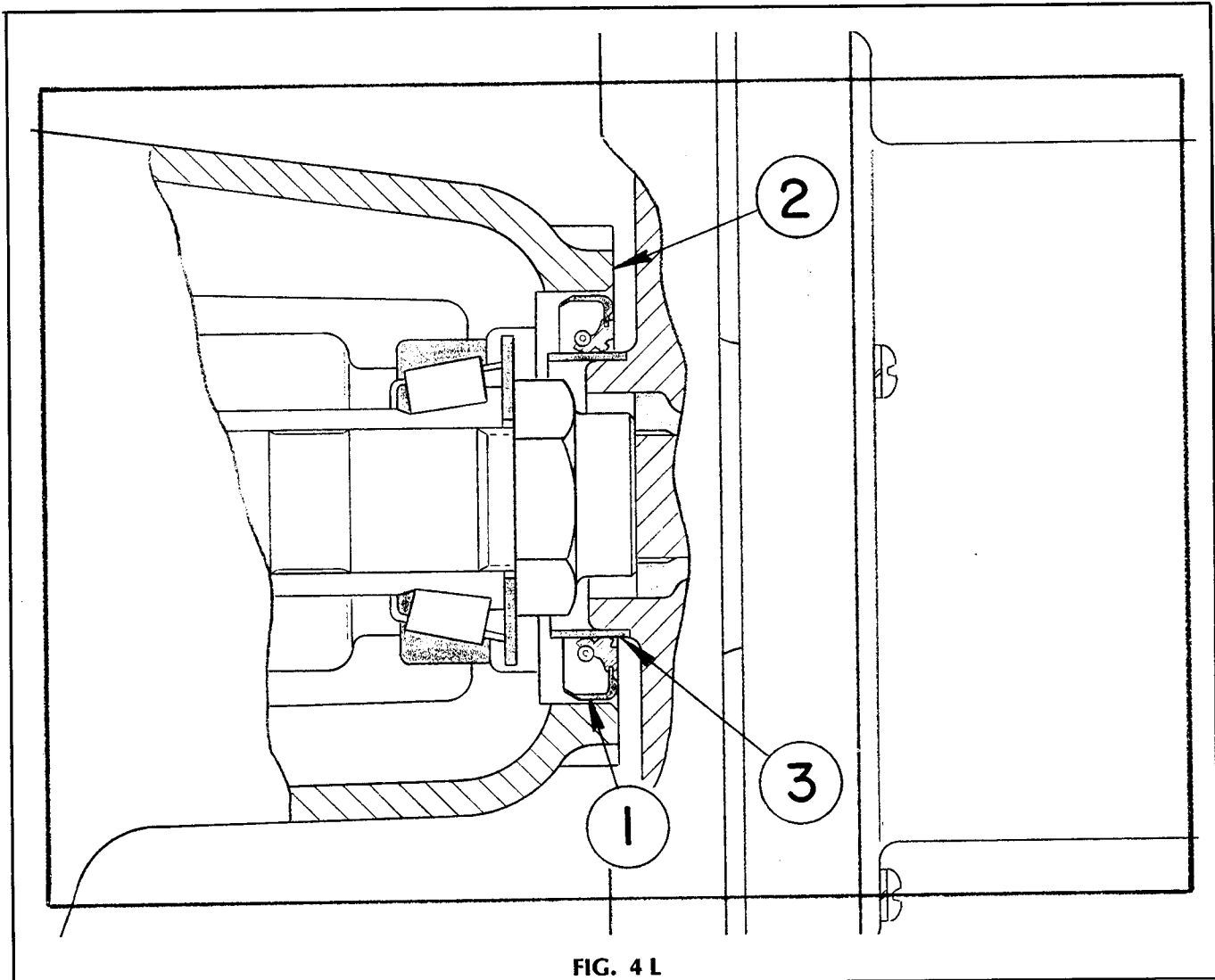


FIG. 4 L

**A-12 TYPE - SERVICE****REMOVING REAR AXLE ASSEMBLY FROM CAR**

Remove drive belt. Remove bolts securing lower end of shock absorbers to axle mounting pads. Hoist rear of car until shock absorbers clear mounting brackets and place car on jack stands. **CAUTION!** if car is raised too high, gas line may separate.

Disconnect brake cables. (Refer to Cable Removal, Section "C").

Place a block or jack stand under front of differential. Remove securing nuts and washers from four bolts (two at each mounting plate) and move axle assembly out.

Reinstall axle assembly in reverse order of removal.

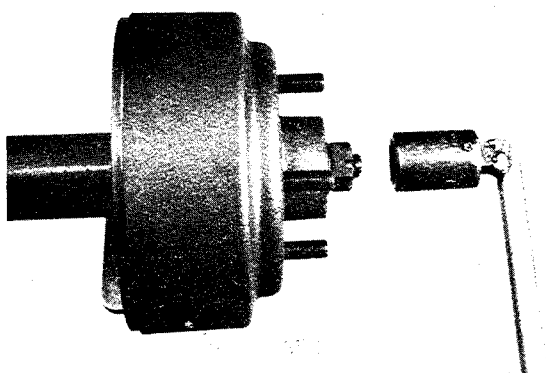
**Wrench Torque Requirements For Rear Axle Assembly**

Differential Cover Screw .....	15 to 35 Ft. Lbs.
Fill Plug .....	5 to 10 Ft. Lbs.
Differential Bearing Cap Bolt .....	35 to 50 Ft. Lbs.
Drive Pinion Nut .....	50 to 80 Ft. Lbs.
Drive Gear Screw (Ring Gear) .....	45 to 65 Ft. Lbs.
Brake Assembly Retaining Nuts .....	23 to 35 Ft. Lbs.

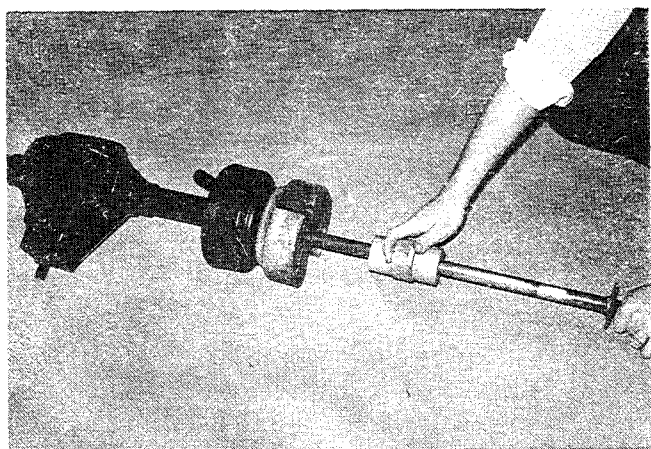
## Section L

### S-12 TYPE - SERVICE

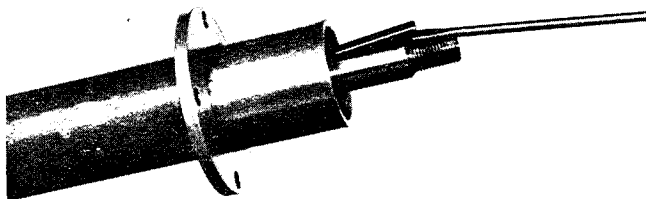
#### DISASSEMBLY AXLE SHAFT



After wheel is removed, remove cotter pin, nut, and washer. Fig. 5L

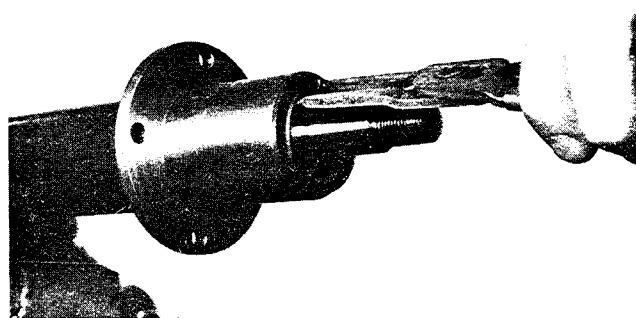


Remove brake drum with "Knocker" type puller Fig. 6L

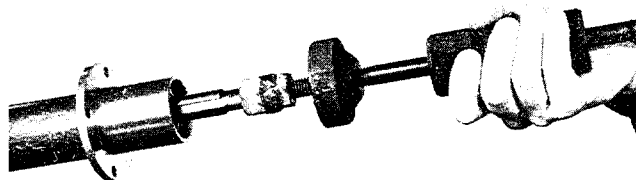


Remove the axle shaft key Fig. 7L NOTE: Brake Removal is not required for items shown in Fig. 5L thru 10L

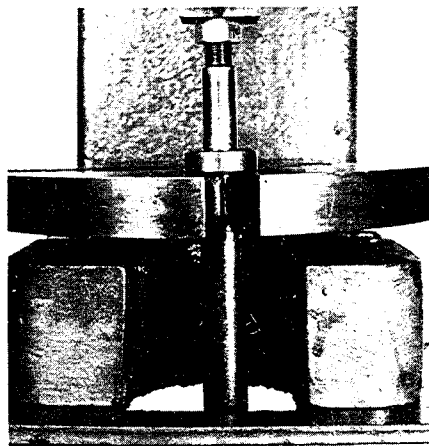
L6



Remove the snap ring retaining the axle shaft bearing assembly. Fig. 8L

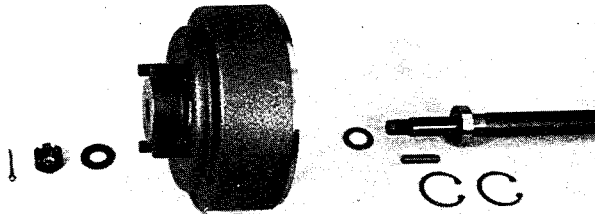


Remove the shaft and bearing assembly as shown. Fig. 9L



Press axle bearing from shaft by supporting bearing inner race on press bed and apply pressure to threaded end of shaft. Fig. 10L

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**ASSEMBLING AXLE**

Place new bearing on axle shaft. Press bearing onto shaft until firmly seated against the shaft shoulder. Fig. 11L **Note:** When reinstalling Brake drum on Axle Shaft. Coat shaft with "Never Seez" Anti Size Compound (E-Z-GO P/N A-12719-G1)

**INSPECTING AXLE PARTS****Bearings**

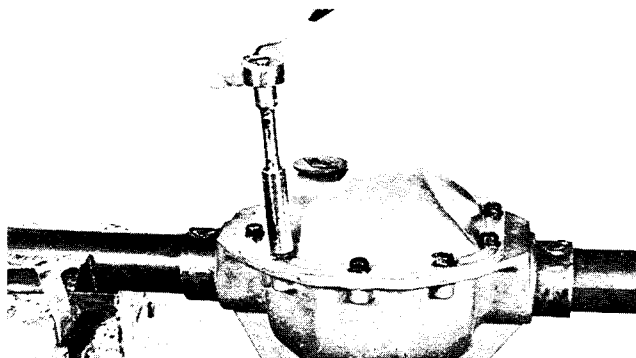
It is recommended, but not necessary, that whenever bearings are removed, they (regardless of mileage) are to be replaced with new ones.

**Oil Seals**

Inspect oil seals for signs of leaking. Look for cuts or cracks. Be sure the spring on the inside of the seal lip is in place.

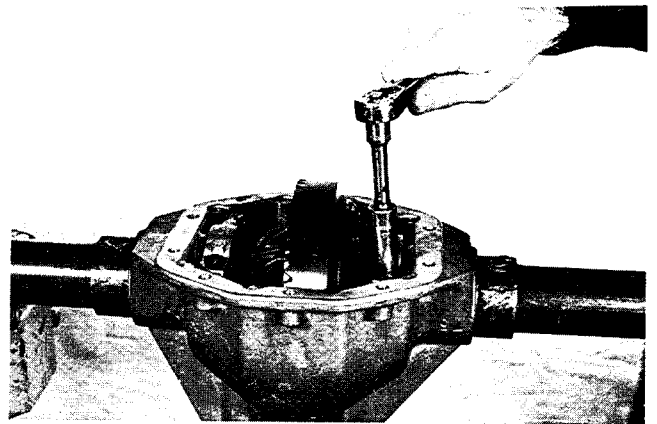
**Axle Shaft Seal Surface**

Inspect sealing surface of shaft. Replace if seal has grooved the surface more than 1/64".

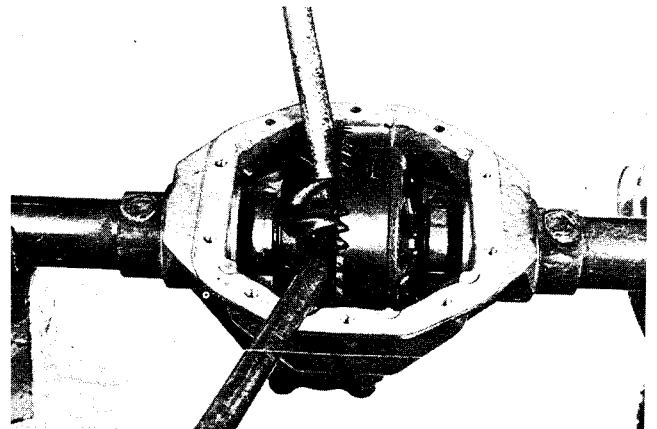
**DISASSEMBLING DIFFERENTIAL**

Remove right and left hand axle shaft assemblies as previously stated. Remove ten cover plate screws and remove rear cover. Fig. 12L

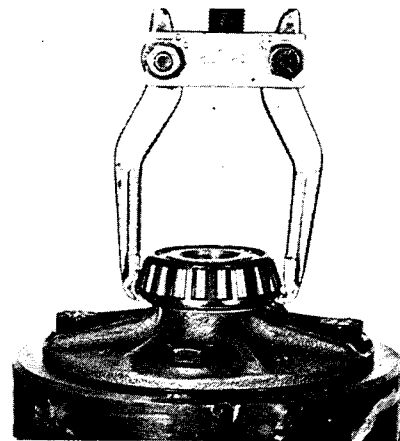
Issued 2/78



Bearing caps are marked for identification. Letters or numbers are in horizontal and vertical position. When reassembling, place them back in the same position. Remove 4 bearing cap screws and remove caps. Place caps in a safe place to avoid damaging their machine surface. Fig. 13L



Pry differential case from the carrier with two pry bars. If new bearings are not required, old bearings and shims are to be replaced same side as removed. Fig. 14L

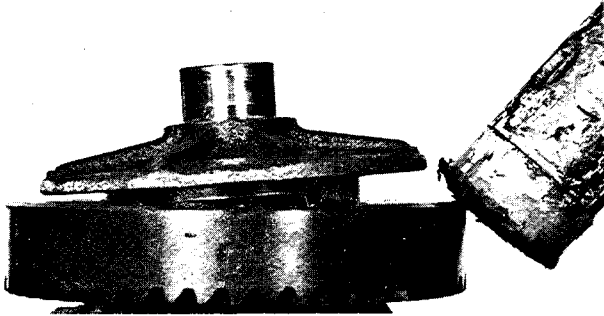


Do not remove bearing from differential case unless bearing failure is evident. When bearings are removed, before you replace them, make sure there is no sign of damage. If damage occurs, replace with new bearings. \*Insert jaw puller into indentations provided in the differential case. Fig. 15L

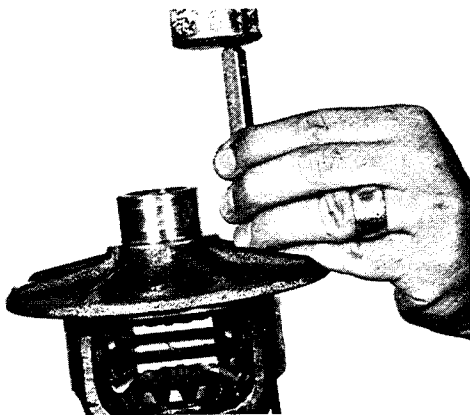
## Section L

### S-12 TYPE - SERVICE

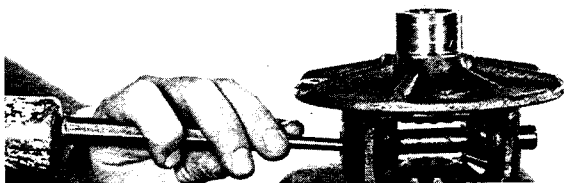
\*Original shims may be re-used if not damaged and must be on the same side as removed.



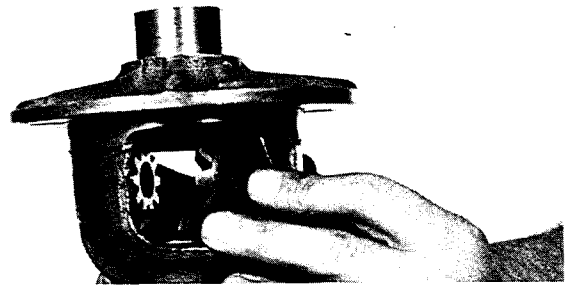
Removing gear cap screws. Using a hard wood block and hammer, drive ring gear off differential case. Be careful not to damage ring gear teeth. Fig. 16L



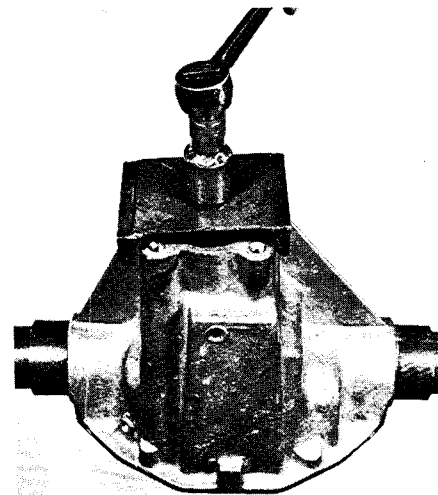
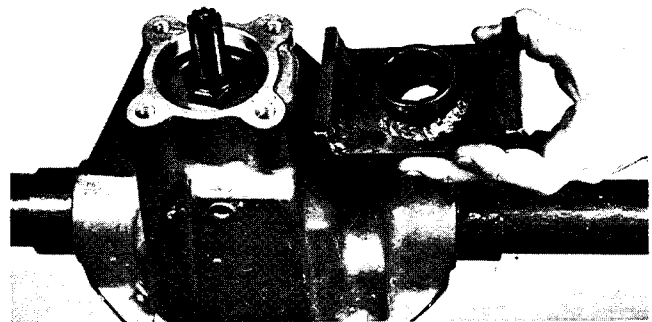
Drive the lock pin out of pinion shaft. Fig. 17L



Supporting differential in a vise, drive pinion shaft from differential with a long drift punch. Fig. 18L

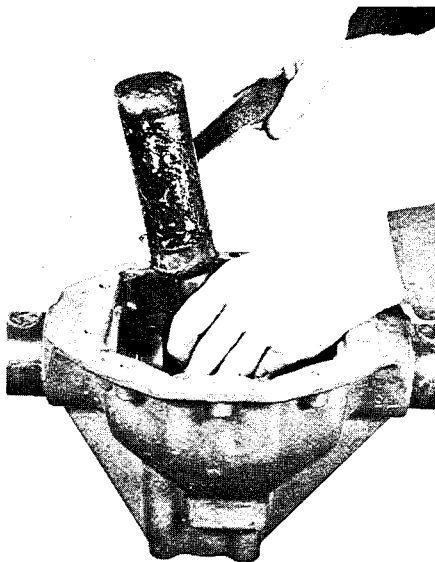


Remove pinion gears and thrust washers by rotating both gears 90° to the opening in differential case. Fig. 19L



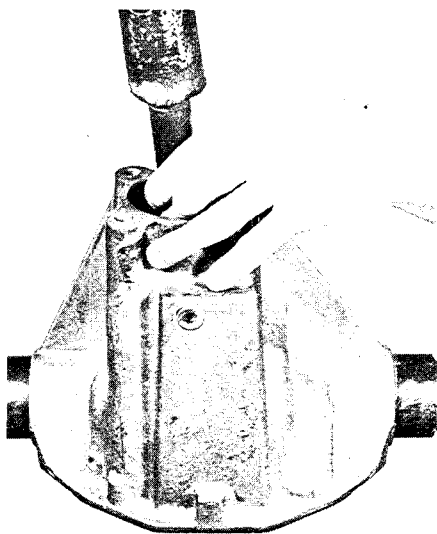
To remove extended spline pinion, hold nut with tool similar to the one shown and turn pinion clockwise until nut is completely loose. Remove pinion. NOTE: Procedure other than suggested could cause damage to unit. Fig. 20L, Fig. 21L



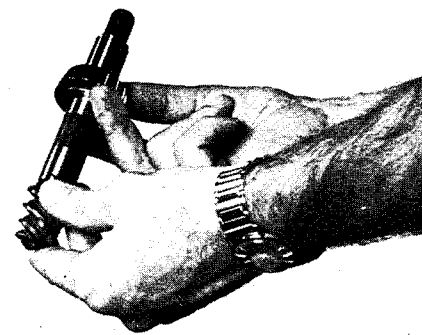


Remove front pinion bearing cup by locating driver on back edge of cup and tapping with hammer. Do not nick carrier bore. Fig. 22L

NOTE: Shims are located between the bearing cup and carrier bore. Exercise caution when removing bearing cup. If shims are damaged, replace.



Place nose of carrier up. Locate driver on back edge of cup; then drive cup out. Be careful — do not nick carrier bore. If shims are damaged when removed, replace. Fig. 23L

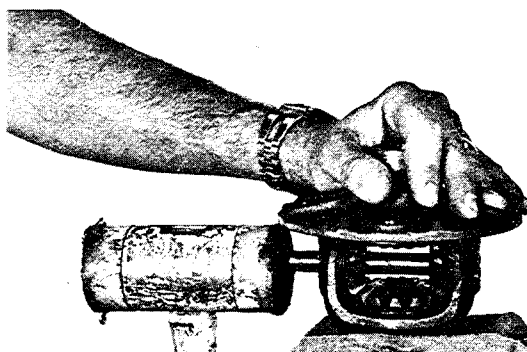


Remove front pinion bearing cone from pinion. Fig. 24L

### CARRIER ASSEMBLY

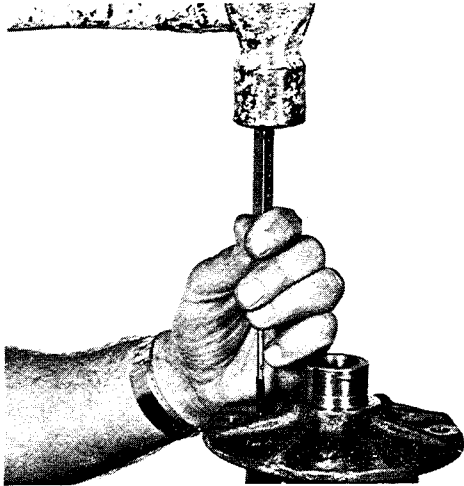


Install thrust washer behind axle side gears and place in differential case. Install the differential pinion mates and thrust washers directly opposite of each other. Fig. 25L

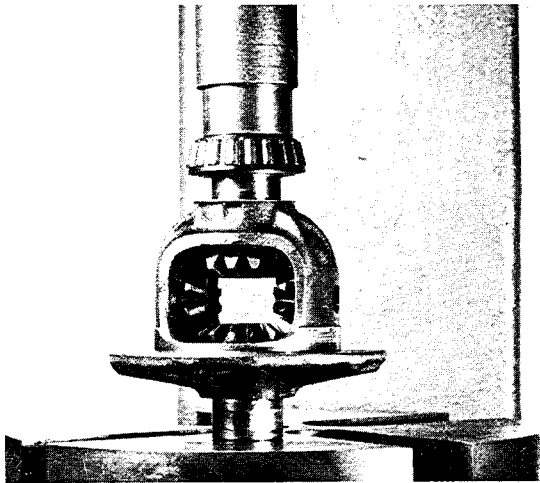


Rotate pinion mates until pinion shaft can be inserted. Fig. 26L

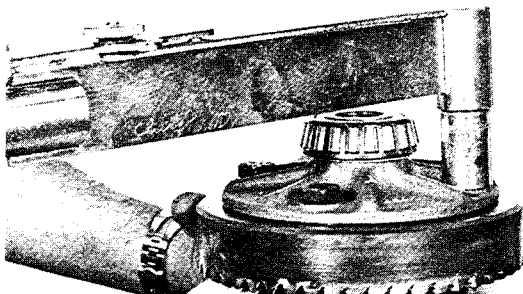
**Section L**  
**S-12 TYPE - SERVICE**



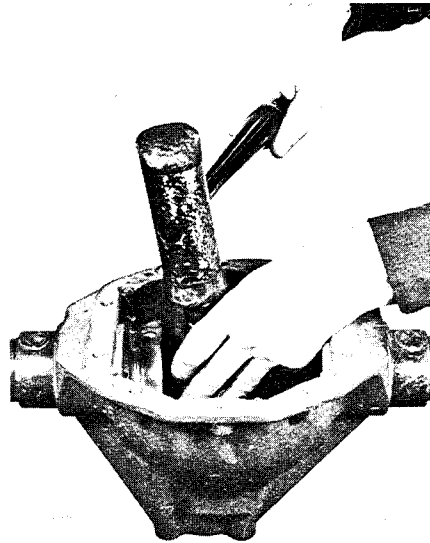
Assemble lock pin. Drive pin to approximate center location of pinion mate shaft. Fig. 27L



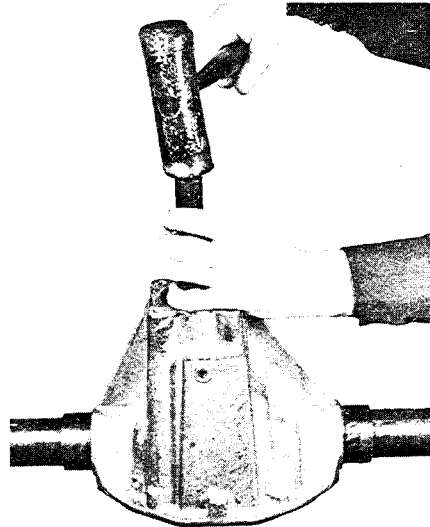
When installing new differential bearings, reuse original shims or use new shims, if required, making sure that shims are intalled on the same side of the case from which they were removed. Fig. 28L



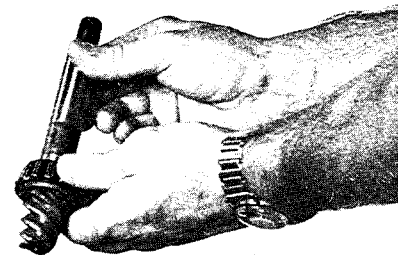
Position ring gear on differential case and start cap screws into gears. Proceed to tighten screws, alternating back and forth across gear to allow gear to be pulled evenly into place. Torque cap screws to 35-45 ft. lbs. Fig. 29L



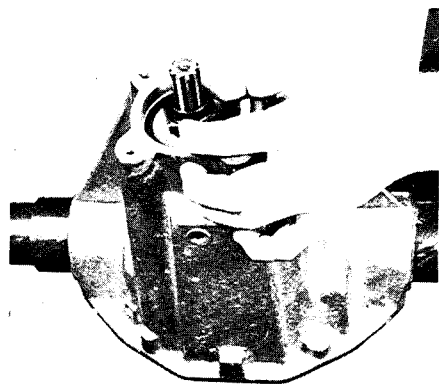
Replace previously removed shims or new shim pack of same thickness, if required, in innerbearing bore. Seat bearing cup into carrier. Fig. 30L



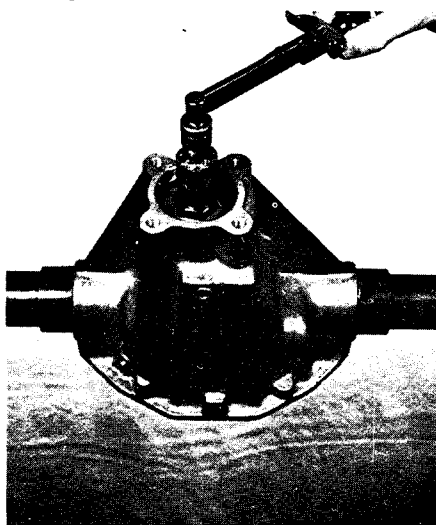
Seat the outer pinion bearing cup into the carrer. Fig. 31L



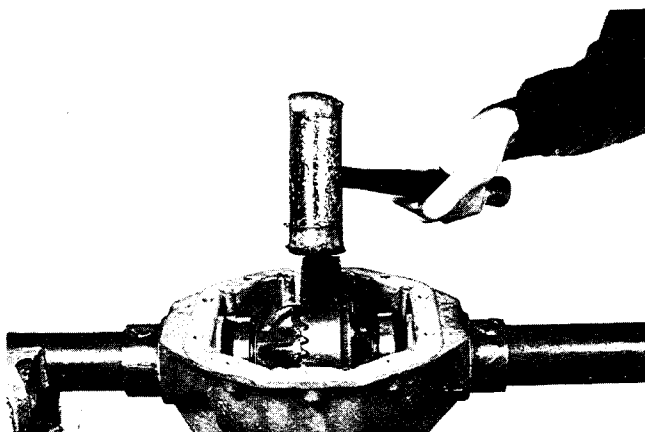
Slip bearing cone on pinion. Fig. 32L



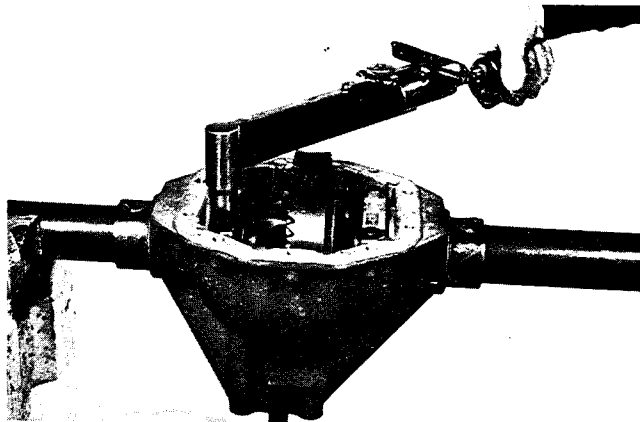
Insert pinion into carrier. Assemble spacer, preload shims (which were removed during disassembly) onto the pinion. Assemble bearing cone, slinger, and pinion nut. Fig. 33L



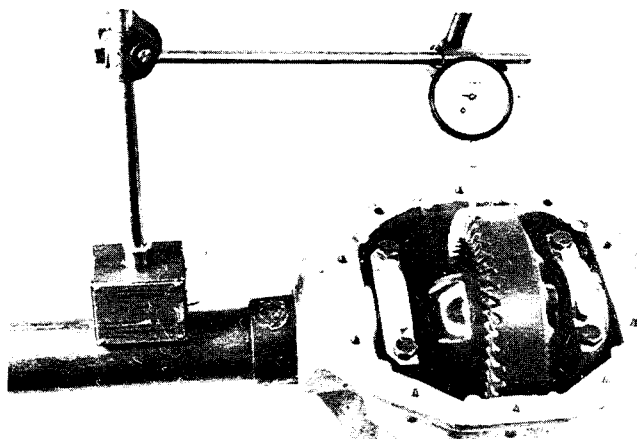
Torque pinion nut to 50-70 lbs. ft. Rotating torque of pinion should read between 2-13 lbs. inch. Fig. 34L



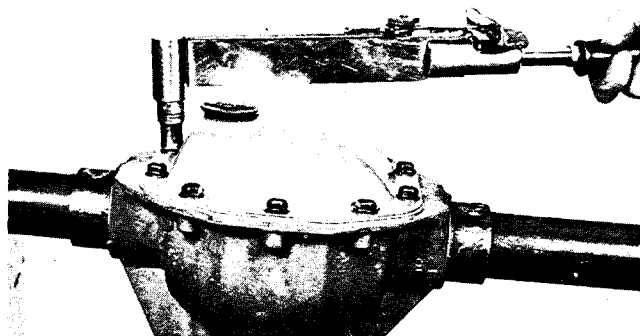
Install differential assembly into carrier, aligning ring gear and pinion teeth to avoid nicking teeth. Tap lightly if necessary. Fig. 35L



Reassemble bearing caps, making sure the letter stamped on the caps corresponds with those on the carrier. Torque bearing cap screws to 35-45 lbs. ft. Fig. 36L



Check ring gear and pinion backlash in three equally spaced locations, using dial indicator. Backlash should be from .004" to .008". High backlash is corrected by moving the ring gear closer to the pinion. Low backlash is corrected by moving the ring gear away from the pinion. These corrections are made by switching shims from one side of the differential case to the other. Fig. 37L



Properly clean surfaces, install new cover gasket, and install cover plate. Torque screws 18-23 lbs. ft. Fig. 38L

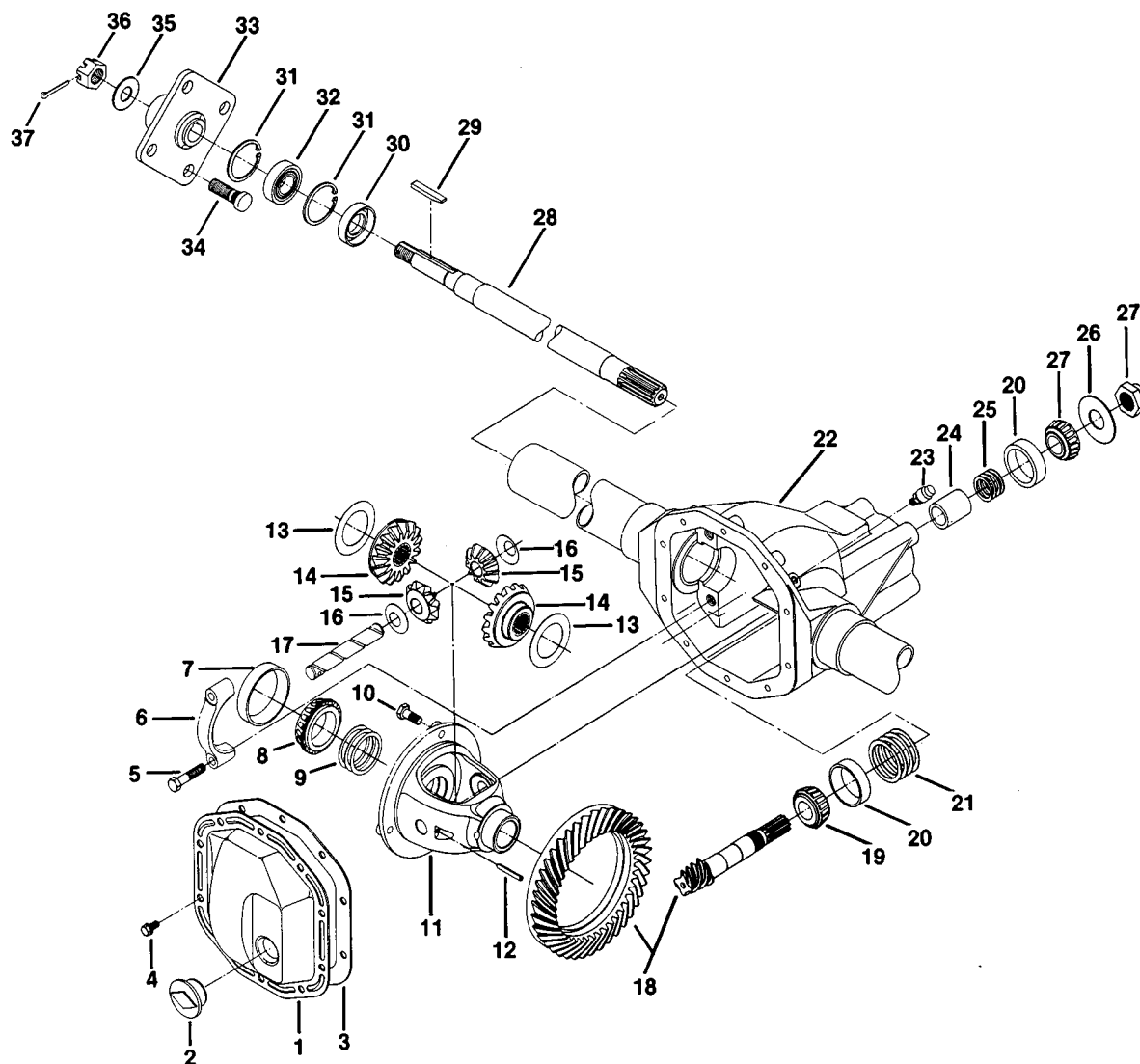


FIG. 39 L

# MODEL S-12 AXLE

ITEM NO.	PARTS IDENTIFICATION
1	Carrier Cover .....
2	Oil Plug .....
3	Cover Gasket .....
4	Breather Plug .....
5	Carrier Cover Bolt .....
6	Bearing Cap Bolt .....
7	Bearing Cap .....
8	Bearing Cup .....
9	Bearing Cone .....
10	Differential Shims .003 ....
	.005 ....
	.010 ....
	.030 ....
11	Drive Gear Screw .....
12	Differential Case .....
13	Lock Pin .....
14	Thrust Washer .....
15	Side Gear .....
16	Pinion Mate .....
17	Thrust Washer .....
18	Pinion Mate Shaft .....
19	Matched Gear & Pinion Assy.
20	Bearing Cone .....
21	Bearing Cup .....
22	Rear Pinion Shims .003 ....
	.005 ....
	.010 ....
23	Axle Housing .....
24	Pinion Bearing Spacer .....
25	Front Pinion Shims .003 ....
	.005 ....
	.010 ....
	.030 ....

ITEM NO.	PARTS IDENTIFICATION
26	Bearing Cup .....
27	Bearing Cone .....
28	Oil Slinger .....
29	Pinion Nut .....
30	Axle Shaft .....
31	Axle Shaft Key .....
32	Oil Seal .....
33	Snap Ring .....
34	Wheel Bearing .....
35	Snap Ring .....
36	Axle Shaft Flange .....
37	Wheel Bolt .....
38	Washer .....
39	Axle Shaft Nut .....

Consult E-Z-GO Parts Manual For Part No.

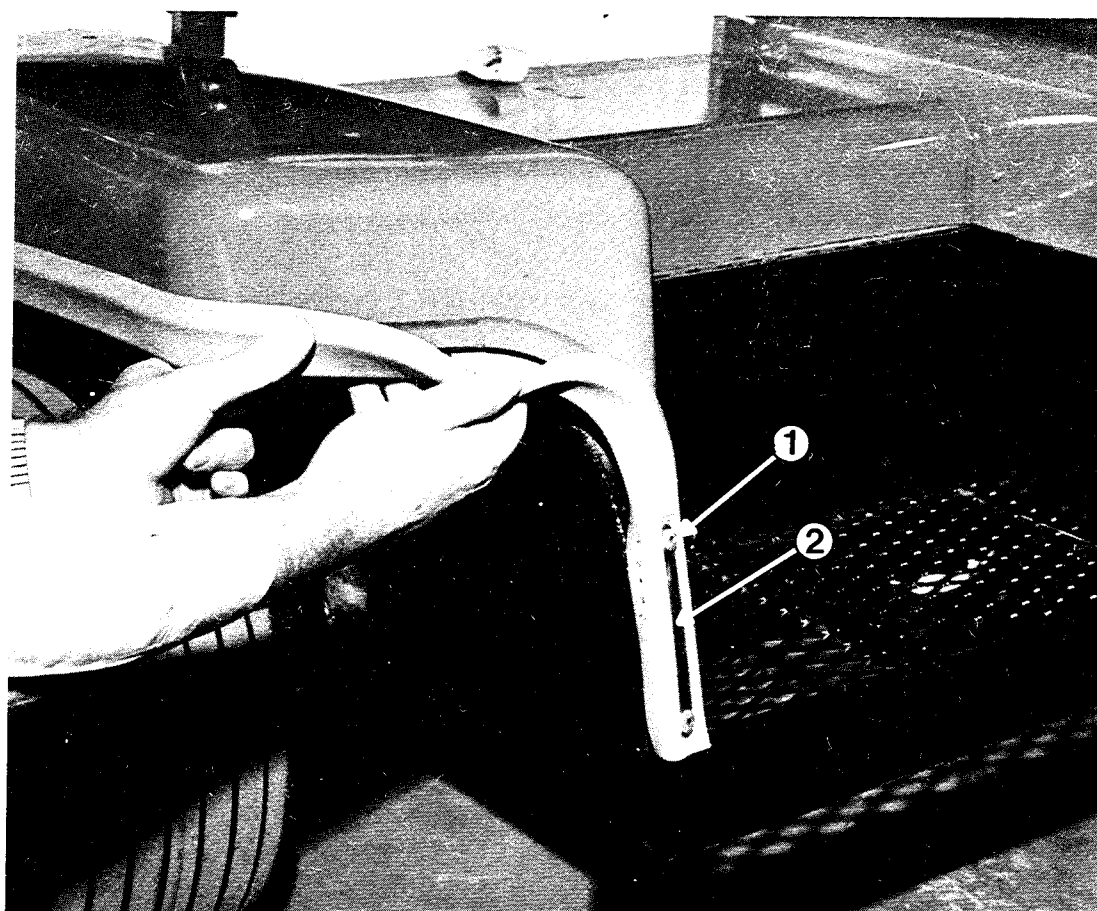


**BODY TRIM**

The body trim consists of a continuous vinyl extrusion installed around the lower edge of the body assembly and across the rear edge of dash tray and front cowl.

**TRIM REMOVAL AND INSTALLATION**

To remove fender trim, drill out rivet where trim meets fender cap (soft cap models). On all metal fender models, drill out 4 rivets (1) from trim retainer strip (2) (Fig. 1M). Remove 5 nuts (3) securing trim retainer strips at floorboard (both sides car) (Fig. 2M). Remove trim retainer assemblies. Grasp loose end of trim at rear of car and pull out and down to remove.

**FIG. 1 M**

## Section M

### Installation

When installing trim it is best to heat the material to a working flexibility. This can be done under field conditions by submerging the part to be installed in a container of hot water (110° to 120°) for approximately ten minutes. Hook trim lip over flange on outside of fender, press down with thumb and push lower edge of trim over lower flange. (Note position of hands in Fig. 1 M).

After trim is installed, replace the retainer strips at the rear bumper with new rivets or screws. Mark the hole locations for retainer strip assemblies at the floorboard by pushing an awl through from the opposite side under floorboard, then drill through trim with a 1/4 inch drill and install retainer in reverse of disassembly.

### FENDER CAP REMOVAL

To remove fender cap, drill out 2 rivets from retainer strip. Drill out 1 rivet, thru fender cap in bag compartment. Remove 3 hex hd screws and locknuts attaching fender cap to fender and remove fender cap. Reinstall in reverse order of disassembly.

### REMOVING AND INSTALLATION REAR FENDER

Remove 5 screws (1) securing arm rest (2) and remove arm rest. (Fig. 3M). Remove trim from fender only. It is not necessary to remove retainer strips at floor board, but rivet thru trim, where trim meets fender cap on soft cap models must be removed. Remove fender cap (soft cap models, to protect from possible damage) and remove trunk lid. Remove 2 nuts (4) (Fig. 2M), remove 3 \*screws (4) (Fig. 3M) securing fender to seat compartment frame. Remove 3 \*screws (4) (Fig. 4M) in bag well area. Lift fender up and to the rear to remove. Install in Reverse order of removal.

**\*NOTE:** Screws (4) are the self-drill and tap-type and may require an impact driver for removal.

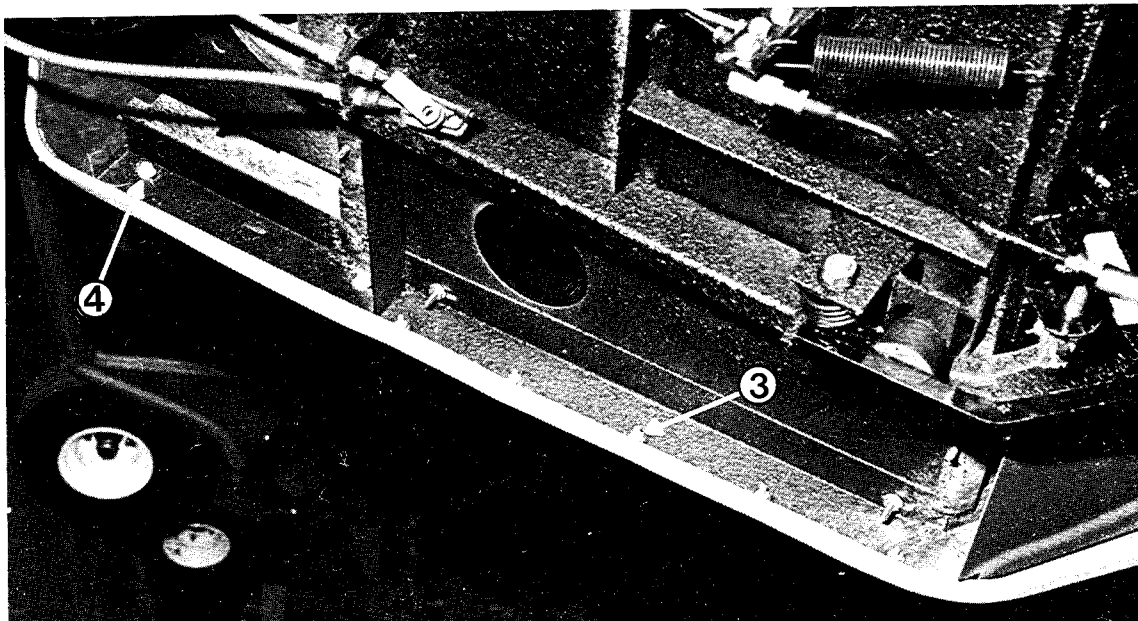


FIG. 2 M



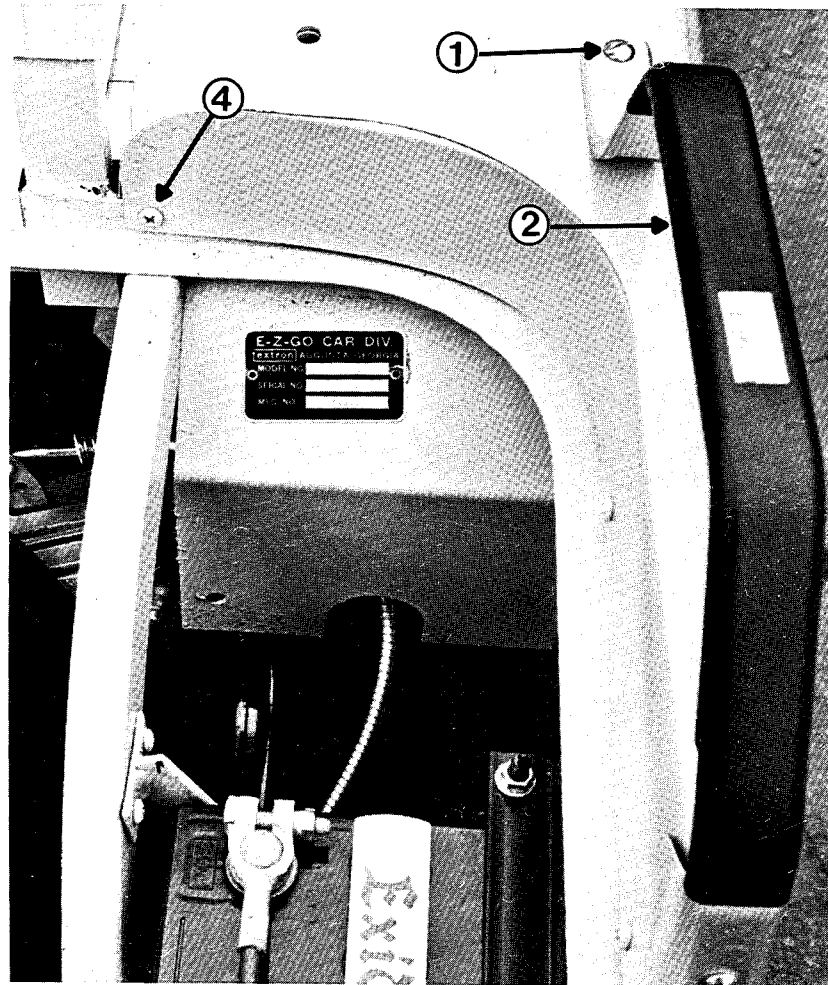


FIG. 3 M

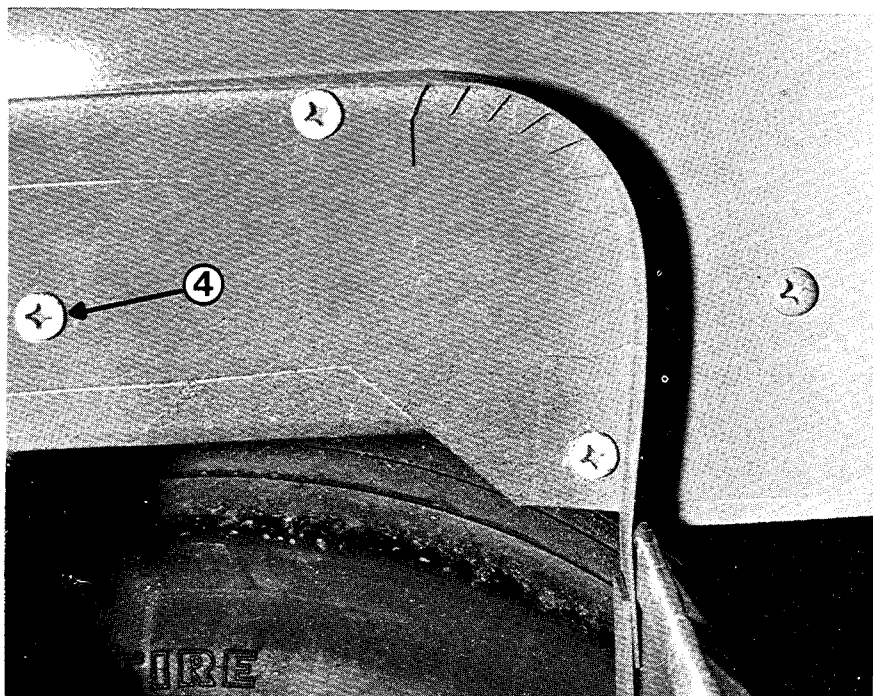


FIG. 4 M

## Section M

### Removing And Installing Front Cowl

#### Three Wheel Car

Remove trim by peeling off at lower corner of cowl. The front cowl is secured to the frame with ten flanged nuts (5), (Fig. 5 M). To gain access to eight of these nuts two floorboard panels must be removed. Lift floormat and remove screws (4), remove panel (1) from both sides, remove nuts (5), (four each side of car). Remove or back off slightly two nuts (5) under front flange of cowl. Pull out on each side of cowl to clear mounting studs from frame, lift to the front and off. Install in reverse order.

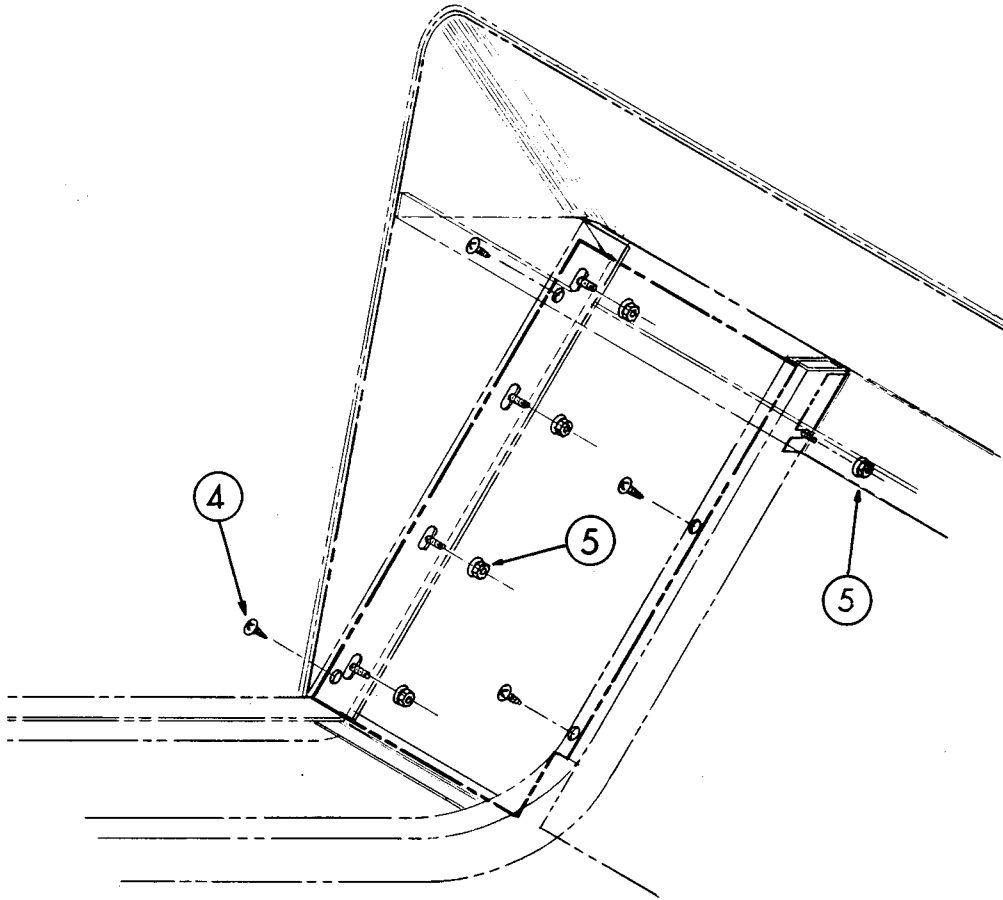


FIG. 5 M

#### Four Wheel Car

Removal procedure for the four wheel car front cowl is the same as for three wheel car except for removal of five nuts (5) under the front. (See Fig. 6 M).

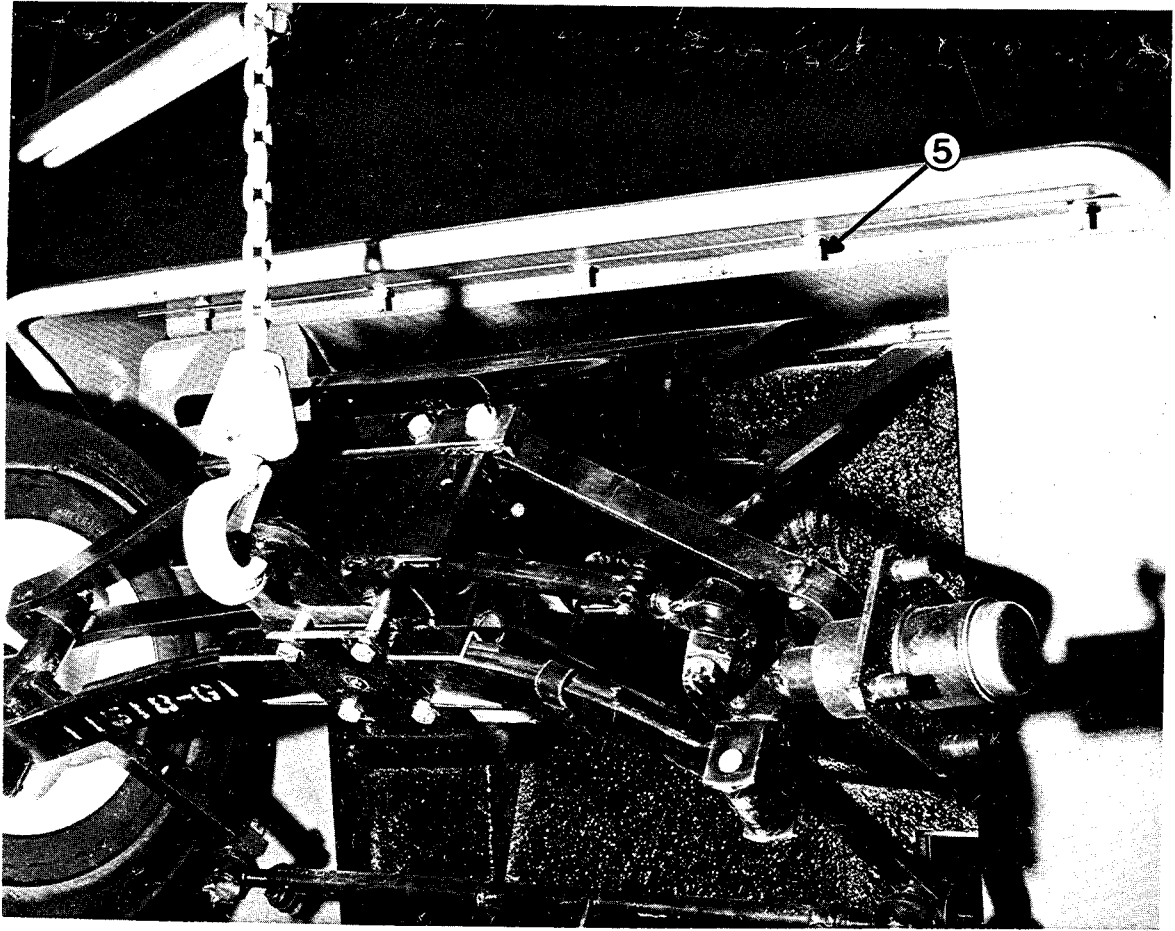


FIG. 6 M

### Seat Wrap Removal

The seat wrap is secured with eleven flanged nuts located inside the engine or battery compartment at the bottom edge and under the top flange. Removal of the rear fenders is required before seat wrap can be removed. (Refer to Removing Rear Fender.) Remove securing nuts and forward and reverse switch handle and remove panel.

When installing a new seat wrap, secure the new panel at front, top and bottom, then hand work the ends around end of seat frame.



The following check list will be helpful in locating difficulties, should they occur. The procedure for taking corrective action can be found in pertinent sections of the Service Manual.

**I. STARTER FAILS TO OPERATE****PROBABLE CAUSE**

- |   |                                    |
|---|------------------------------------|
| 1. Dead battery.                                  | 6. Starter solenoid inoperative.   |
| 2. Blown fuse.                                    | 7. Brushes excessively worn.       |
| 3. Ignition switch inoperative.                   | 8. Dirty commutator (on armature). |
| 4. Defective or dirty forward and reverse switch. | 9. Burned or damaged field coils.  |
| 5. Interruption in electrical circuit.            |                                    |

**II. ENGINE ROTATES BUT FAILS TO START****PROBABLE CAUSE**

- |   |  |
|---|--|
| 1. Gas tank empty.                                  | 6. Engine flooded.                                   |
| 2. Gas line failure or gas filter clogged.          | 7. Ignition points burned or out of adjustment.      |
| 3. Fouled spark plug.                               | 8. Defective condensor.                              |
| 4. Loose wire or bad connection in ignition system. | 9. Plugged muffler, exhaust ports, or exhaust pipes. |
| 5. Defective coil.                                  | 10. Carburetor throttle lever restriction.           |

**III. ENGINE HARD TO START****PROBABLE CAUSE**

- |                                      |  |
|--------------------------------------|--|
| 1. Spark plug in poor condition.     | 7. Ignition points out of adjustment or damaged. |
| 2. Plugged air filter.               | 8. Poor cylinder compression.                    |
| 3. Fuel pump diaphragm ruptured.     | 9. Weak ignition coil.                           |
| 4. Water and/or dirt in fuel system. | 10. Incorrect ignition timing.                   |
| 5. Loose wiring in ignition circuit. | 11. Bad crankshaft seals.                        |
| 6. Plugged gas tank cap vent.        | 12. Bad condensor.                               |

## Section X

### IV. ENGINE STARTS BUT RUNS ROUGH OR STALLS

#### PROBABLE CAUSE

1. Spark plug in poor condition.
2. Spark plug gap too close.
3. Fuel pump diaphragm ruptured.
4. Weak ignition coil.
5. Weak condensor.
6. Improper gas/oil mixture.
7. Plugged gas tank cap vent.
8. Water and/or dirt in fuel and/or carburetor.
9. Loose wires in ignition circuit.
10. Air leak at intake system.
11. Ignition points out of adjustment or in need of cleaning.
12. Dirty air filter.
13. Plugged muffler.
14. Clogged or dirty main jet.

### V. LOSS OF POWER

#### PROBABLE CAUSE

1. Fuel pump diaphragm ruptured.
2. Poor cylinder compression.
3. Ignition points out of adjustment.
4. Pre-ignition.
5. Engine over heating.
6. Partially plugged muffler exhaust ports or pipes.
7. Incorrect ignition timing.
8. Broken spring on carburetor lever.
9. Carburetor throttle lever restriction.

### VI. ENGINE OVER HEATS

#### PROBABLE CAUSE

1. Clogged cylinder or cylinder head cooling fins.
2. Not enough oil in gas.
3. Oil and gas not mixed thoroughly.
4. Exhaust ports, muffler or pipes partially clogged.

### VII. REPEATED SPARK PLUG FOULING

#### PROBABLE CAUSE

1. Wrong type plug.
2. Wrong type of oil in gas.
3. Unsuitable gasoline.
4. Wrong gas/oil mixture.
5. Dust leak in air intake system.
6. Choke Sticking Shut

### VIII. CARBURETOR FLOODS

#### PROBABLE CAUSE

1. Inlet valve or inlet valve seat dirty or damaged.
2. Diaphragm in fuel pump leaking.
3. Plugged air cleaner.

**IX. EXCESSIVE SMOKING**

**PROBABLE CAUSE**

1. Improper oil/gas mixture.
2. Improper oil type.
3. Fuel pump diaphragm ruptured.

**X. STARTER DYNAMO DOES NOT CHARGE BATTERY PROPERLY**

**PROBABLE CAUSE**

- |   |   |
|---|---|
| 1. Interruption in charging circuit.            | 5. Dirty Commutator.                              |
| 2. Defective double switch in charging circuit. | 6. Shorted commutator.                            |
| 3. Defective voltage regulator.                 | 7. Burned or damaged field coil.                  |
| 4. Excessively worn brushes.                    | 8. Defective or dirty forward and reverse switch. |

