

## SECTION 3-C ADJUSTMENTS AND REPLACEMENTS—EXCEPT IN PUMP AND CARBURETOR ASSEMBLIES

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### 3-7 AIR CLEANER, FUEL FILTER, MANIFOLD VALVE AND VENTILATOR VALVE SERVICE

#### a. Air Cleaner Service

An air cleaner with a dirty element will restrict the air flow to the carburetor and cause a rich mixture at all speeds. The device will not properly remove dirt from the air and the dirt entering the engine will cause abnormal formation of carbon, sticking valves, and wear of piston rings and cylinder bores.

Regular cleaning and inspection of the element at 12000 mile intervals (or more frequently in dusty territory) is necessary to prevent excessive engine wear and abnormal fuel consumption. The procedure for cleaning the air cleaner is given in paragraph 1-1.

#### b. Cleaning Fuel Filter

The fuel filter is a can-type throw-away filter and is located in the line between the fuel pump and the carburetor.

The filter element has a large filtering area. It is of fine enough material to assure that any particles which pass through it are too small to interfere with the operation of the float needle and seat, and also too small to cause clogging of the smallest passages



Figure 3-13—Can-Type Throw-Away Fuel Filters

in the carburetor. This filter prevents the passage of water under ordinary conditions. The filter should be replaced every 24000 miles for maximum filtering efficiency. See paragraph 1-1.

After assembling the fuel filter, always start the engine and observe the filter carefully to make sure that the clamps are not leaking.

A woven plastic filter is located on the lower end of the fuel pickup pipe in the gas tank. This filter prevents dirt from entering the fuel line and also stops water unless the filter becomes completely submerged in water. This filter is self cleaning and normally requires no maintenance. Fuel stoppage at this point indicates that the gas tank contains an abnormal amount of sediment or water; the

tank should therefore be removed and thoroughly cleaned.

#### c. Cleaning Carburetor Gasoline Strainers

Fine mesh strainers are located in some carburetors above each needle and seat. These strainers should seldom require cleaning because of the fuel filter which precedes them in the supply line. They should be inspected however, if fuel supply at carburetor inlet is adequate but carburetor operation indicates lack of fuel.

#### d. Freeing Up Sticking Exhaust Manifold Valve—401 and 425 Engines

Lubricate the exhaust manifold flange shaft every 6000 miles (par. 1-1).

Carbon or lead salt deposits around the valve shaft may cause the valve to stick or become sluggish in operation. A valve sticking in the open position will cause slow engine warm up, excessive spitting and sluggish engine operation when cold. A valve sticking in the closed position will cause overheating, loss of power, and hard starting when the engine is hot, and may also cause warped or cracked manifolds. Sticking in either position will adversely affect fuel economy.

If the manifold heat control valve is sticking or seized in the flange assembly, free it up by applying a good solvent such as "Buick Heat Trap Lubricant" to the

valve shaft and bushings at both sides of the flange. Allow the solvent to soak for a few minutes, then work the valve by rotating the counterweight. Severe cases may be freed by tapping endwise on the shaft with a light hammer. After the shaft is free, another application of lubricant will assure complete penetration of the shaft bushings.

#### e. Checking Manifold Valve Thermostat Setting—401 and 425 Engines

The setting of the exhaust manifold valve thermostat may be checked when the engine is at room temperature of approximately 70°F. Unhook the outer end of thermostat from anchor pin on the manifold and hold the valve in the closed position. To bring the end of thermostat to the anchor pin will then require approximately 1/2 turn wind-up of the thermostat as shown in Figure 3-14.

The thermostat is not adjustable and should never be distorted or altered in any way as this will affect its calibration. If the thermostat does not have the proper setting, or is damaged, it should be replaced.

Fully open and fully closed positions of the exhaust manifold valve may be checked by the position of the heavy section of the manifold

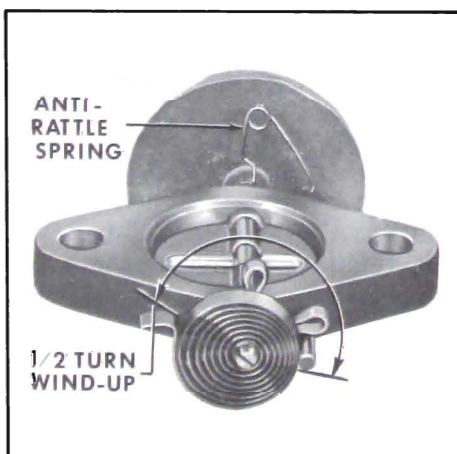


Figure 3-14—Manifold Valve Thermostat Wind-Up

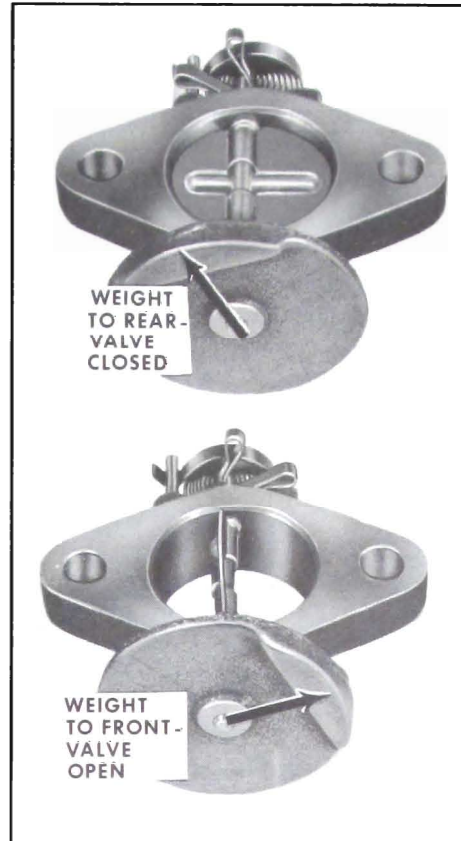


Figure 3-15—Manifold Heat Control Valve Positions

valve weight. If the heavy section is to the rear and approximately 45 degrees up, the valve is fully closed; if the heavy section is forward and approximately 45 degrees up, the valve is fully open. See Figure 3-15.

#### f. Positive Crankcase Ventilator System Service

All cars have a positive crankcase ventilating system to help reduce air pollution and to provide more complete scavenging of crankcase impurities. Ventilation air is drawn in through the filter in the filler cap on the left rocker arm cover, down into the crankcase, across and up into the right rocker arm cover, up through the ventilator valve, through a hose, into the carburetor throttle body and into the intake manifold. Intake manifold vacuum draws any fumes from the crankcase to be burned in the engine.

When air flow through the carburetor is high, added air from the positive crankcase ventilating system has no noticeable effect on engine operation; however, at idle speed, air flow through the carburetor is so low that any large amount added by the ventilating system would upset the air-fuel mixture, causing rough idle. For this reason, a flow control valve is used which restricts the ventilating system flow whenever intake manifold vacuum is high.

After a period of operation, the ventilator valve may become clogged, which reduces and finally stops all crankcase ventilation. An engine which is operated without any crankcase ventilation can be damaged seriously. Therefore, it is important to replace the ventilator valve periodically (each time the engine oil filter is replaced). **CAUTION:** If an engine is idling too slow or rough, this may be caused by a clogged ventilator valve; therefore, never adjust the carburetor idle without first checking the crankcase ventilator check valve.

With the crankcase ventilator system operating normally, about 1/4 of the air used in the idle mixture is supplied through the ventilator valve. Therefore, if the ventilator air is shut off, the idle speed will be noticeably slower. Check operation of the ventilator system as follows:

1. Connect a reliable tachometer and adjust idle as specified.
2. Squeeze-off crankcase ventilator hose to stop all air flow.
3. If idle speed drops 60 RPM or more, crankcase ventilator system is okay.
4. If idle speed drops less than 60 RPM, ventilator system is probably partially clogged; install



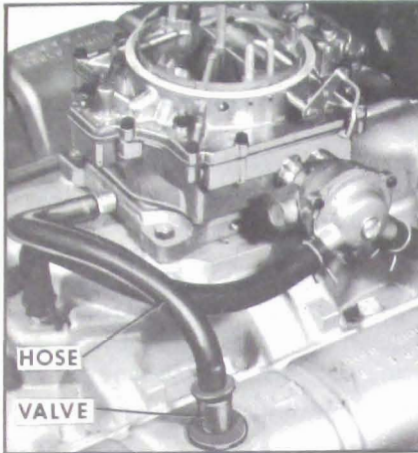


Figure 3-16—Positive Crankcase Ventilator System—300 Engine

a new ventilator valve and recheck operation of system as described above.

5. After installing a new ventilator valve, always readjust engine idle.

### 3-8 CARBURETOR IDLE AND AUTOMATIC CHOKE ADJUSTMENTS

Carburetor adjustment should not be attempted until it is known that engine ignition and compression are in good order. Any attempt to adjust or alter the carburetor to compensate for faulty conditions elsewhere in items affecting engine performance will result in reduced fuel economy and overall performance.

#### a. Idle Speed and Mixture Adjustments

The positive crankcase ventilator valve should be checked as described in paragraph 3-7 before making carburetor adjustments, as this valve noticeably affects the air-fuel ratio at idle.

1. Remove air cleaner. Connect a tachometer from distributor terminal of coil to ground.

2. Start engine and run it at fast idle until upper radiator tank is hot and choke valve is wide open.

**CAUTION:** Idle speed and mixture adjustments cannot be sat-

isfactorily with an abnormally hot engine. On any carburetor with a hot idle compensating valve, it is particularly important that idle adjustments be made at normal temperature so that this valve will be closed.

3. On automatic transmission cars, place a block in front of a front wheel and apply parking brake firmly, then shift transmission into drive.

4. Adjust throttle stop screw to set idle speed at 500 RPM (550 with air conditioner).

**CAUTION:** On Series 4400 automatic transmission cars, make sure that idle stator switch is closed while adjusting idle. See paragraph 3-9, c.

5. Adjust idle mixture needles alternately to obtain highest tachometer reading.

6. Readjust throttle stop screw to reduce idle speed to specifications. If idle speed was reduced very much, readjust idle mixture needles slightly for highest tachometer reading and smoothest engine idle.

7. If carburetor is equipped with a hot idle compensating valve, press a finger on valve to make sure it was closed. If idle speed drops, valve was open; readjust idle speed and mixture, making sure valve remains closed.

#### b. Automatic Choke Adjustments

The choke thermostat is calibrated to give satisfactory performance with regular blends of fuel when it is placed at the standard factory setting, which is listed in the specifications for each carburetor.

When it is necessary to adjust the thermostat, loosen the housing or cover attaching screws and turn as required.

Thermostat settings other than standard should be used only when

the car is habitually operated on special blends of fuel which do not give satisfactory warm-up performance with the standard setting. A "Lean" setting may be required with highly volatile fuel which produces excessive loading or rolling of engine on warm-up with the standard thermostat setting. A "Rich" setting should be used only when excessive spitting occurs on engine warm-up with the standard thermostat setting. When making either a "Lean" or "Rich" setting, change one point at a time and test results with engine cold, until the desired performance is obtained.

If the engine operates on fast idle too long after starting or else moves to slow idle too soon, or the choke unloader does not operate properly, check the fast idle and choke unloader adjustments.

### 3-9 THROTTLE LINKAGE AND TRANSMISSION SWITCH ADJUSTMENTS

**NOTE:** Throttle linkage adjustment on dual 4-barrel cars is covered in paragraph 3-28.

The procedure for adjusting the throttle linkage is identical on synchromesh and automatic transmission cars. On Series 4400 automatic transmission cars, however, the throttle linkage also actuates two transmission switches connected by wires to two solenoid valves located inside the transmission. Series 46-47-4800 automatic transmission cars have only one transmission control switch. Whenever the throttle linkage is adjusted on an automatic transmission car, the transmission switches should also be checked and adjusted if necessary.

#### a. Throttle Linkage Adjustment

1. Remove air cleaner. Check throttle linkage for proper lubrication. Make sure that linkage

is free in all positions and that return spring fully closes the throttle, even though throttle is released very slowly.

2. Unsnap front end of throttle operating rod from carburetor throttle lever. See Figure 3-17. While another man presses accelerator pedal against floor mat, hold carburetor throttle lever in wide open position and hold throttle rod socket in alignment with ball on throttle lever. Socket must be approximately 1/16 inch (2 turns) short of ball. If adjustment is necessary, loosen lock nut, adjust throttle rod length as required, and retighten lock nut.

3. With accelerator pedal released, reinstall throttle rod on throttle lever. With accelerator pedal pressed again to floor mat, recheck throttle for wide open position.

### b. Transmission Detent Switch Adjustment (Automatic Transmission Cars)

On all automatic transmission cars, a transmission detent switch is mounted at the full throttle position of the carburetor throttle lever. When the throttle linkage is moved to wide open throttle position, the switch contacts are closed to cause the transmission to "downshift".

On 2-speed automatic transmission cars only, the switch also has a second set of contacts which close slightly before wide open throttle position to cause the stator blades in the transmission to "switch-the-pitch" to high performance angle. See Figures 3-17 and 3-18.

To adjust either type of detent switch, hold carburetor at wide open throttle and adjust switch plunger so that it is approximately .050 inch from bottom.

### c. Idle Stator Switch Adjustment (Automatic Transmission Cars)

Used only with the 2-speed automatic transmission, this switch closes just before the throttle reaches slow idle position; this causes a solenoid valve in the transmission to operate, which, in turn, causes the stator blades to "switch-the-pitch" to high angle. This reduces the transmission load on the engine at idle, thereby reducing the tendency of the car to creep. See Figure 3-17.

Before adjusting the idle stator switch, engine idle speed and mixture must be adjusted. Adjust as follows:

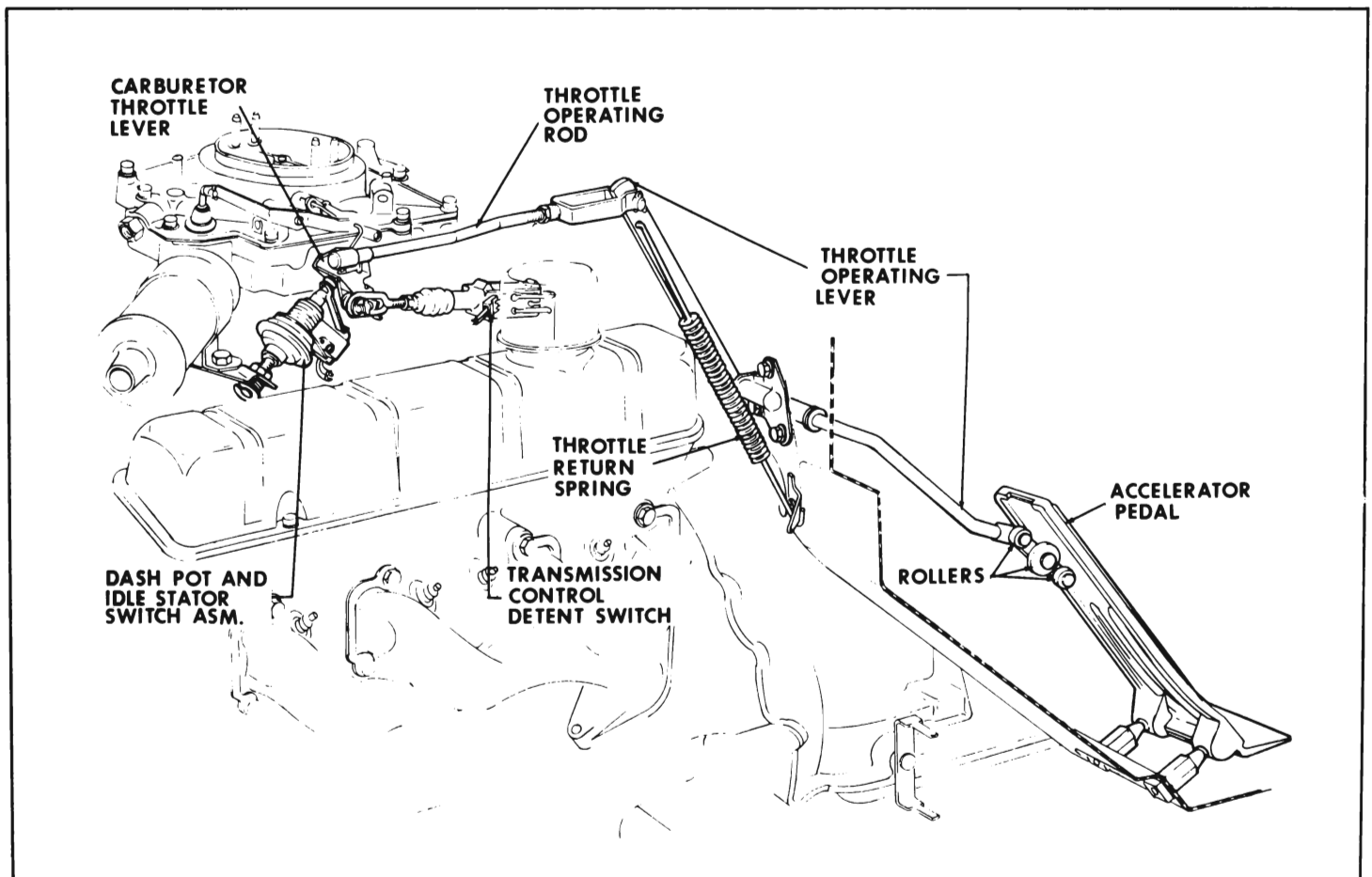


Figure 3-17—Throttle Linkage and Transmission Control Switches-300 Engine

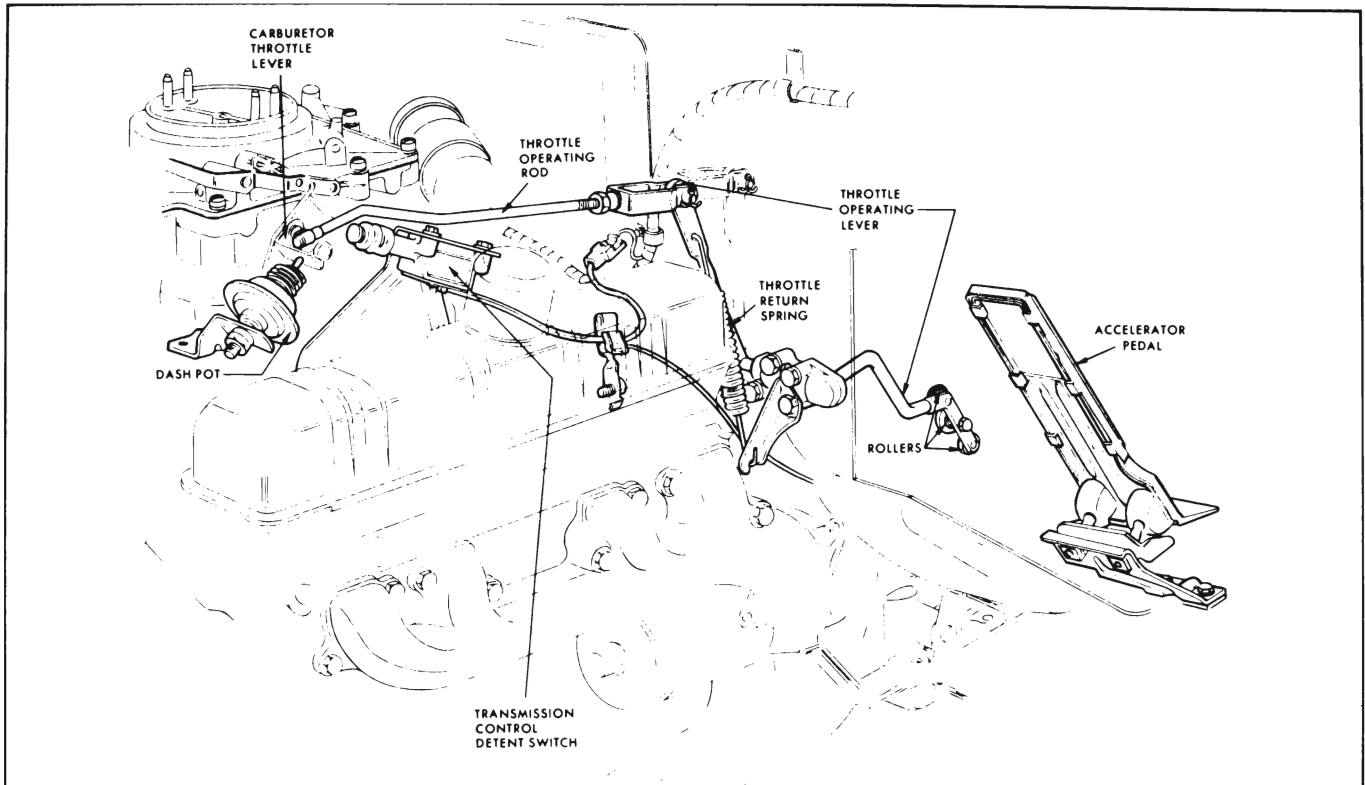


Figure 3-18—Throttle Linkage and Transmission Control Switch—401 and 425 Engines

1. Normalize engine temperature; adjust engine idle speed and mixture. See paragraph 3-8.
2. Shut engine off. Unplug idle stator switch connector and plug prods of a test light (such as Diode Test Light J-21008) into end of connector.
3. Turn stator switch adjusting nut to back switch away from throttle lever until test light is out (switch open).
4. Turn adjusting nut to move stator switch toward throttle lever until light just comes on, then turn ten flats (ten notches) in addition, to make sure switch always closes at idle.
5. Remove test light and reconnect stator switch connector.

#### **d. Dash Pot Adjustment (3-Speed Automatic Transmission Cars)**

1. Loosen dash pot lock nut.

2. With carburetor closed to curb idle position, rotate dash pot until plunger just touches throttle lever. Make a reference mark on dash pot, then rotate it 5 full turns toward throttle lever (depressing plunger).

3. Retighten lock nut.

### **3-10 REPLACEMENT OF GAS TANK OR GAS GAUGE TANK UNIT**

#### **a. Description**

In all series of large cars, three different gas tanks are used. Series 4400-4600-4800 cars except estate wagons have a tank which is located in the kick-up area over the rear axle and is held in place with four bolts through the tank flange; estate wagons have a different tank which is located to the rear of the single exhaust system muffler and is held in place with two straps. Rivas have a different tank which

has the filler located in the rear center.

A total of six different tank units are required, because, if the car is equipped with air conditioning, the tank unit must have two pipes - the feed pipe and a vapor return pipe.

#### **b. Removing and Installing Gas Gauge Tank Unit (Except Station Wagons and Rivas)**

It is not necessary to remove the gas tank to replace the tank unit as there is an access hole in the trunk shelf through which the tank unit can be removed. Remove the unit as follows:

1. Remove spare tire and wheel.
2. Remove access hole cover screws and pry up access cover.
3. Disconnect gas hose or hoses. Disconnect wire. Remove tank unit retaining screws and remove tank unit.

4. Install new tank unit and gasket in reverse order of above steps. Make sure access hole cover has sealing compound around the edge for a water-tight seal.

### c. Removing Gasoline Tank (Except Estate Wagons and Rivas)

1. Siphon gasoline from tank. A convenient way is to disconnect rubber hose from forward end of steel line along right frame side rail. Then slip siphon hose over end of steel line.

2. Remove muffler - tail pipe assembly as a unit.

3. Loosen bolt in right end of track bar. Remove bolt from left end of track bar and push left end of track bar down out of the way.

4. Remove three bolts which fasten right end of track bar cross member to frame. Remove track bar cross member from car.

5. Disconnect breather hose from breather U-tube in body near upper left side of tank.

6. Disconnect tank filler by sliding filler pipe up until clear of gas tank. See Figure 3-19.

7. Disconnect gas gauge wire at connector over right frame side rail.

8. Disconnect gas tank hose from rear end of steel line along right frame side rail.

9. Remove two nuts from front edge of tank and two bolts from rear edge of tank. Lower tank.

### d. Installing Gasoline Tank (Except Estate Wagons and Rivas)

1. Install gas gauge tank unit in tank. Connect gas hose and gas gauge wire to tank unit. Connect breather hose at upper left side of tank.

2. Raise gas tank into position. Install two bolts in rear edge of tank and two nuts on studs at front edge of tank.

3. Connect gas tank hose to rear end of steel line.

4. Connect gas gauge wire at connector over right frame side rail.

5. Clean and oil lower 2 inches of filler pipe. Connect tank filler by sliding filler pipe down into "O" ring seal in tank neck.

6. Connect breather hose to forward breather tube.

7. Fasten right end of track bar cross member loosely to frame.

8. Install large bolt through left end of track bar cross member.

Tighten right end of cross member to frame bolts to 50 ft. lbs. Tighten track bar bolts to 100 ft. lbs.

CAUTION: Car must be at trim height while tightening track bar bolts so that rubber bushings will be in a neutral position.

9. Install muffler - tail pipe assembly.

10. Lower car and check gas gauge for correct empty reading.

11. Fill gas tank and again check gauge reading. Check for gasoline leaks.

### e. Removing and Installing Gasoline Tank (Estate Wagons and Rivas)

Estate wagon and Riviera gasoline tanks are located in a completely different location - to the rear of the muffler. See Figure 3-20 or 21. Therefore, it is not necessary to remove any other parts before removing the gas tank. The tank is held in place by two straps and two nuts.

On the estate wagon or Riviera, the gasoline tank must be lowered to remove and install a gas gauge tank unit.

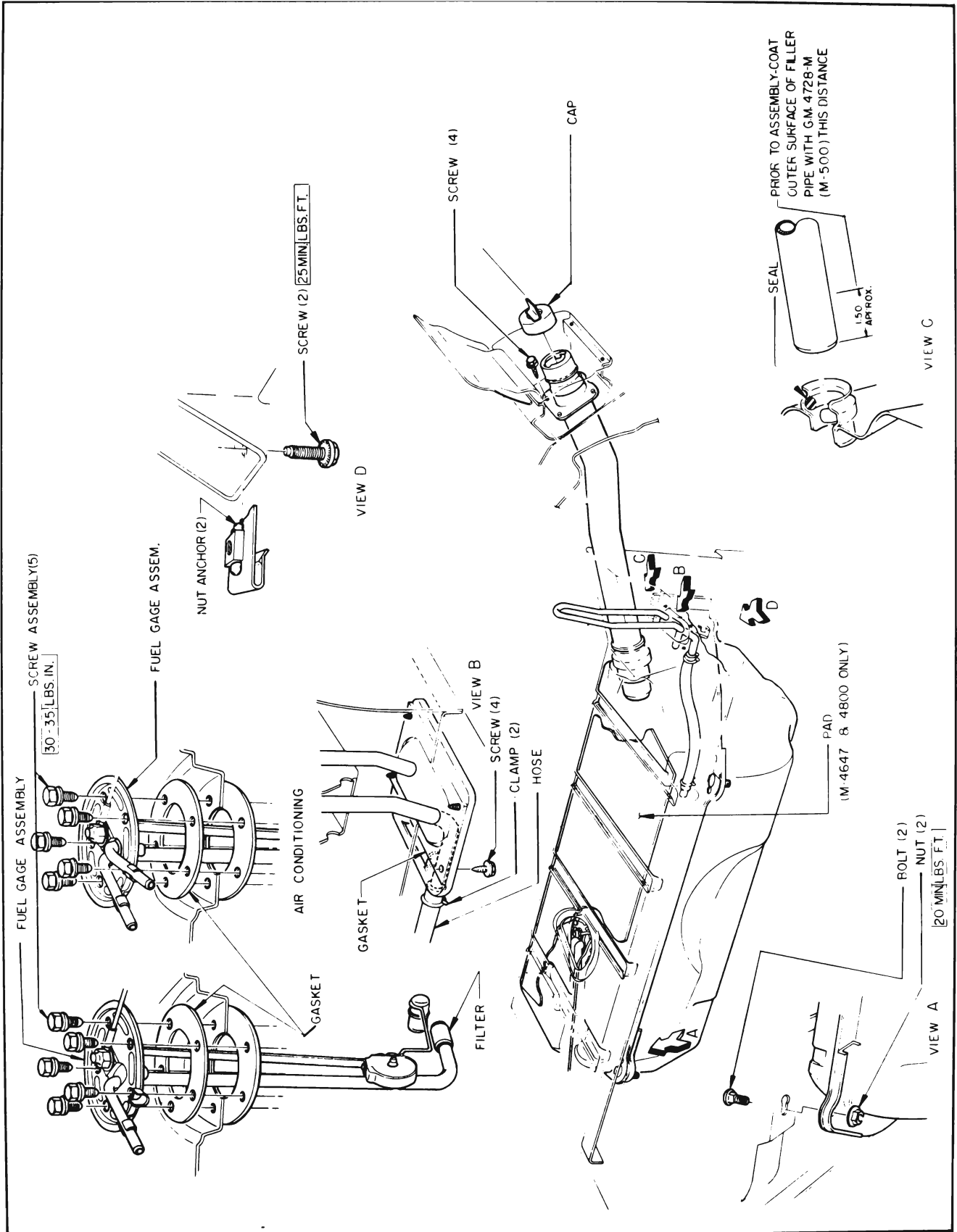


Figure 3-19—Fuel Tank

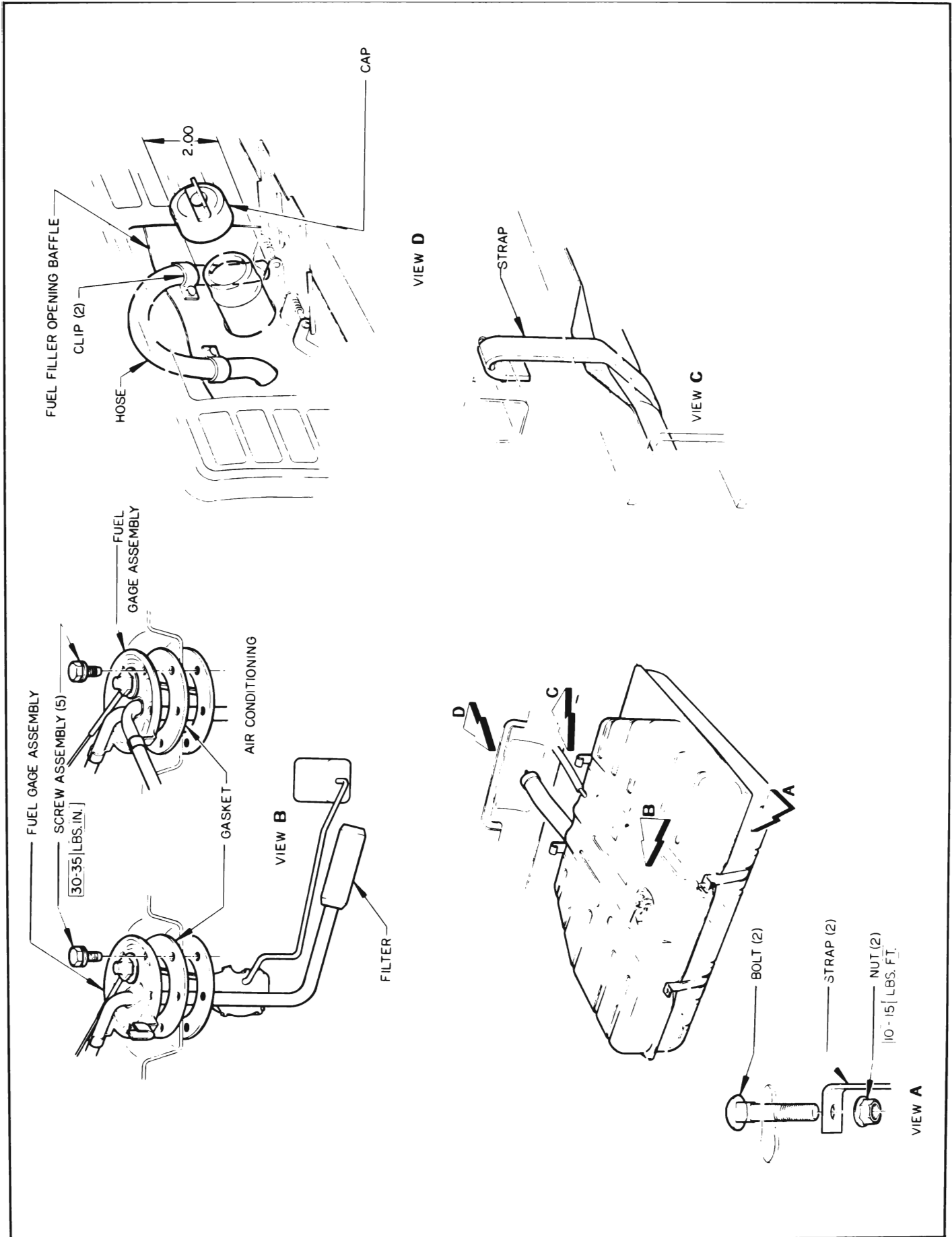


Figure 3-20—Fuel Tank—Rivieras



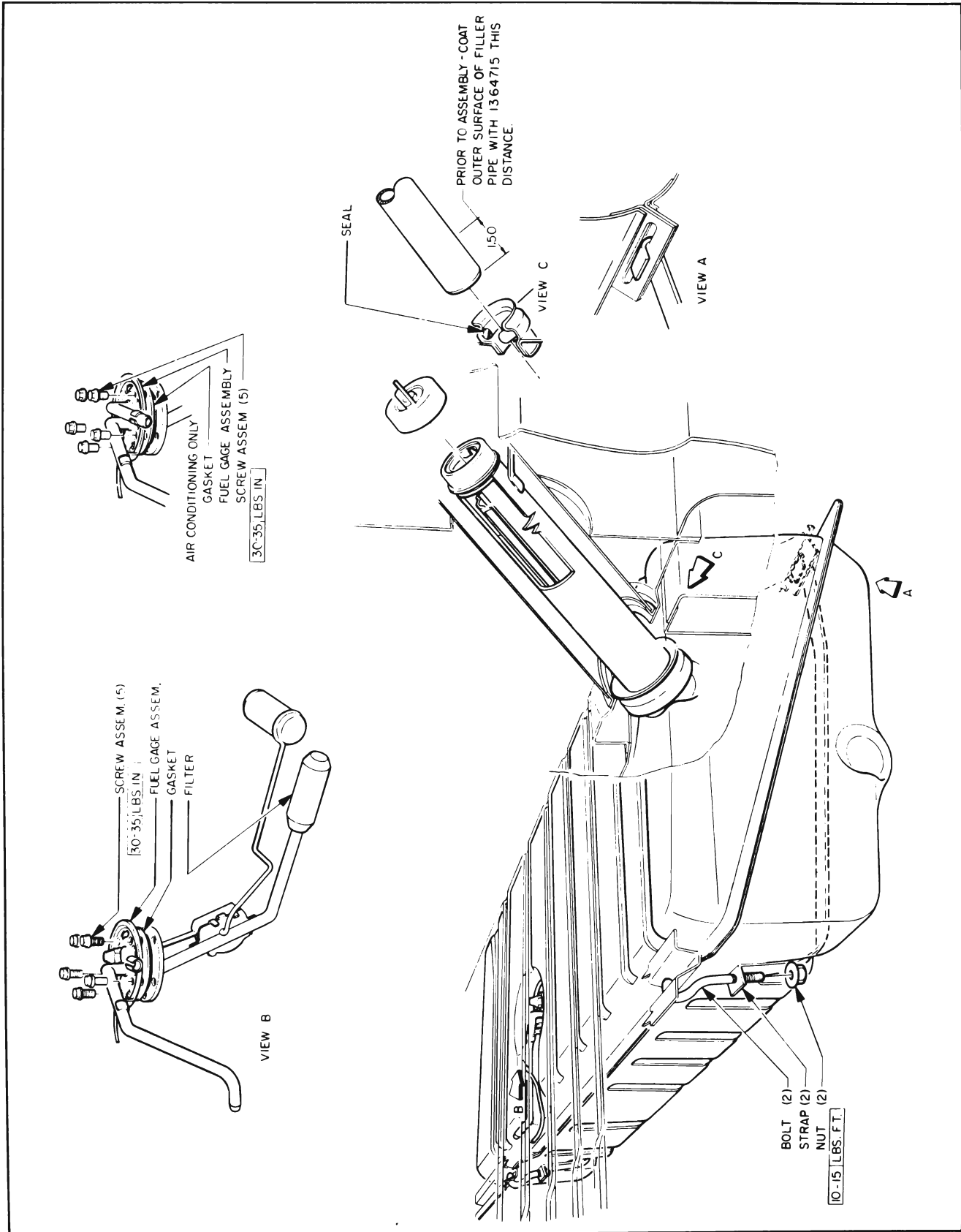


Figure 3-21—Fuel Tank—Wagons