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

## CONTENTS OF SECTION 3-C



## 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

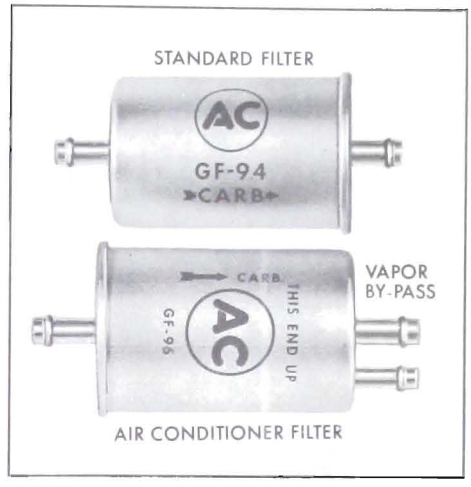


Figure 3-11—Can-Type Throw-Away Fuel Filters

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

Lubricate the exhaust manifold valve 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 manifold, 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 exhaust manifold. 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

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 3-12.

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.

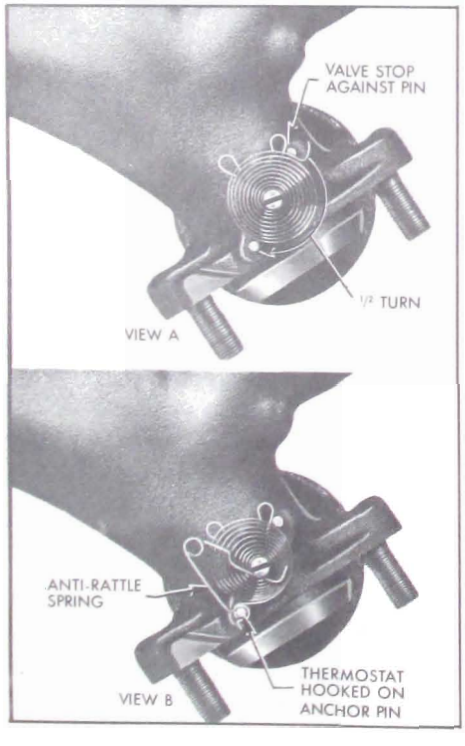


Figure 3-12—Exhaust Manifold Valve—Inner Side

Fully open and fully closed positions of the exhaust manifold valve may be checked by the position of the heavy section of the manifold valve weight. If the heavy section is approximately straight up, the valve is fully closed; if the heavy section is forward, the valve is fully open. See Figure 3-13.

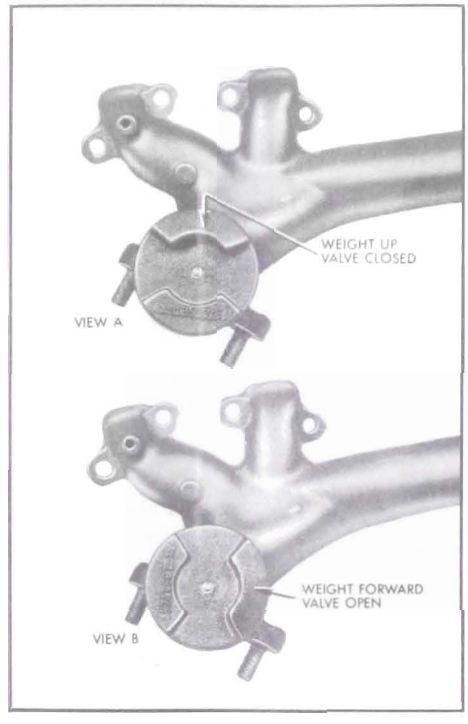


Figure 3-13—Choke Heat Pipe and Manifold Valve Positions

### 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

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 all items affecting engine Ignition and Compression are in good order, as outlined in paragraph 2-9. 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. Initial Setting of Idle Needle Valves and Throttle Stop Screw

1. With engine stopped, turn both idle needle valves clockwise until they are lightly seated. Forcing valves hard against seats will score valves and seats and ruin them for proper adjustment.

2. Now turn each needle OUT one full turn. This setting should give an approximate idle mixture so that engine can be warmed up for final adjustment as described below.

3. Back off throttle stop screw and hold fast idle cam in HOT (choke open) position so that throttle valves are fully closed.

4. On all carburetors, turn throttle stop screw IN (clockwise) until it just contacts, then turn screw IN one complete turn. This setting should give an approximate idling speed so that engine can be warmed up for final adjustment as described below. For more exact initial settings, see specifications for carburetor being adjusted.

### b. Final Adjustment of Idle Needle Valves and Throttle Stop Screw

1. With throttle stop screw and idle needle valves at the initial settings described above (subpar. a), start the engine and run it until the upper radiator tank is hot to the touch and the choke valve is wide open.

CAUTION: Idle mixture and speed adjustments cannot be made satisfactorily 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.

2. With engine at normal operating temperature, place a block in front of a front wheel and apply parking brake firmly. Then shift automatic transmission into drive position or manual transmission into neutral.

3. Adjust throttle stop screw so that engine is idling at 475 RPM (525 RPM with air conditioning).

4. Adjust one needle valve at a time to provide smooth idle, as follows:

(a) Slowly turn needle valve "IN" (clockwise) until engine just begins to lag or run irregularly because of lean mixture.

(b) Slowly turn needle valve "OUT" until engine just begins to "roll" or "gallop" because of rich mixture.

(c) Slowly turn needle "IN" just enough to provide the smoothest engine operation.

(d) Repeat this same procedure on the other needle valve.

5. Readjust the throttle stop screw to provide a hot idling speed of 475 RPM (525 RPM on air conditioned cars) in drive. If the idling speed increased very much during the needle valve adjustments it may be necessary to readjust the needle valves slightly to insure smoothest engine operation at the corrected idle speed.

Final adjustment of the carburetor idle needle valves also may be made with the aid of a combustion tester, tachometer, or vacuum gauge. When such instruments are used, be sure they are in good condition and are used in accordance with the instructions of the manufacturer.

### c. 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 as described in paragraph 3-17 (Rochester 2-Bbl.), 3-21 (Carter), or 3-25 (Rochester 4-Bbl.).

## 3-9 THROTTLE LINKAGE AND DASH POT ADJUSTMENTS

When adjusting throttle linkage on automatic transmission cars, it should be kept in mind that the throttle linkage actuates other linkage connected to the stator control valve in the transmission. Also, all automatic transmission cars have a dash pot to prevent engine stalling from rapid release of the accelerator pedal. Many times a stator linkage adjustment and a dash pot adjustment are also required when adjusting throttle linkage.

### a. Throttle Linkage Adjustment

1. Make sure that accelerator pedal is in good condition and that floor mat is properly installed. Make sure pedal ball studs are tight in floor pan.

2. Remove air cleaner. Check throttle linkage for proper lubrication. Make sure that pedal rod does not bind going through dash, and make sure that return spring fully closes the throttle.

3. Move throttle lever to wide open position and check to make sure stator linkage does not prevent throttle from opening completely. If this is the case, make stator linkage adjustment (subpar. b) before proceeding with throttle linkage adjustment.

4. Disconnect rear end of throttle rod from throttle operating lever. See Figure 3-14.

5. While another man presses accelerator pedal firmly against floor mat, hold throttle in wide open position, and hold rear end of throttle rod at hole in throttle operating lever. Rod end must be approximately 1/16" short of entering hole in lever. Readjust throttle rod length as required to obtain this condition.

6. Connect throttle rod to operating lever and secure new cotter pin.

7. Hold choke valve lightly closed and move throttle lever to wide open position to check adjustment of choke unloader. If choke unloader does not operate properly, adjust as described in paragraph 3-17 (Rochester 2-Bbl.), 3-21 (Carter), or 3-25 (Rochester 4-Bbl.).

8. Finally, check for smooth operation of linkage from fully closed to wide open position of throttle. Make sure that throttle

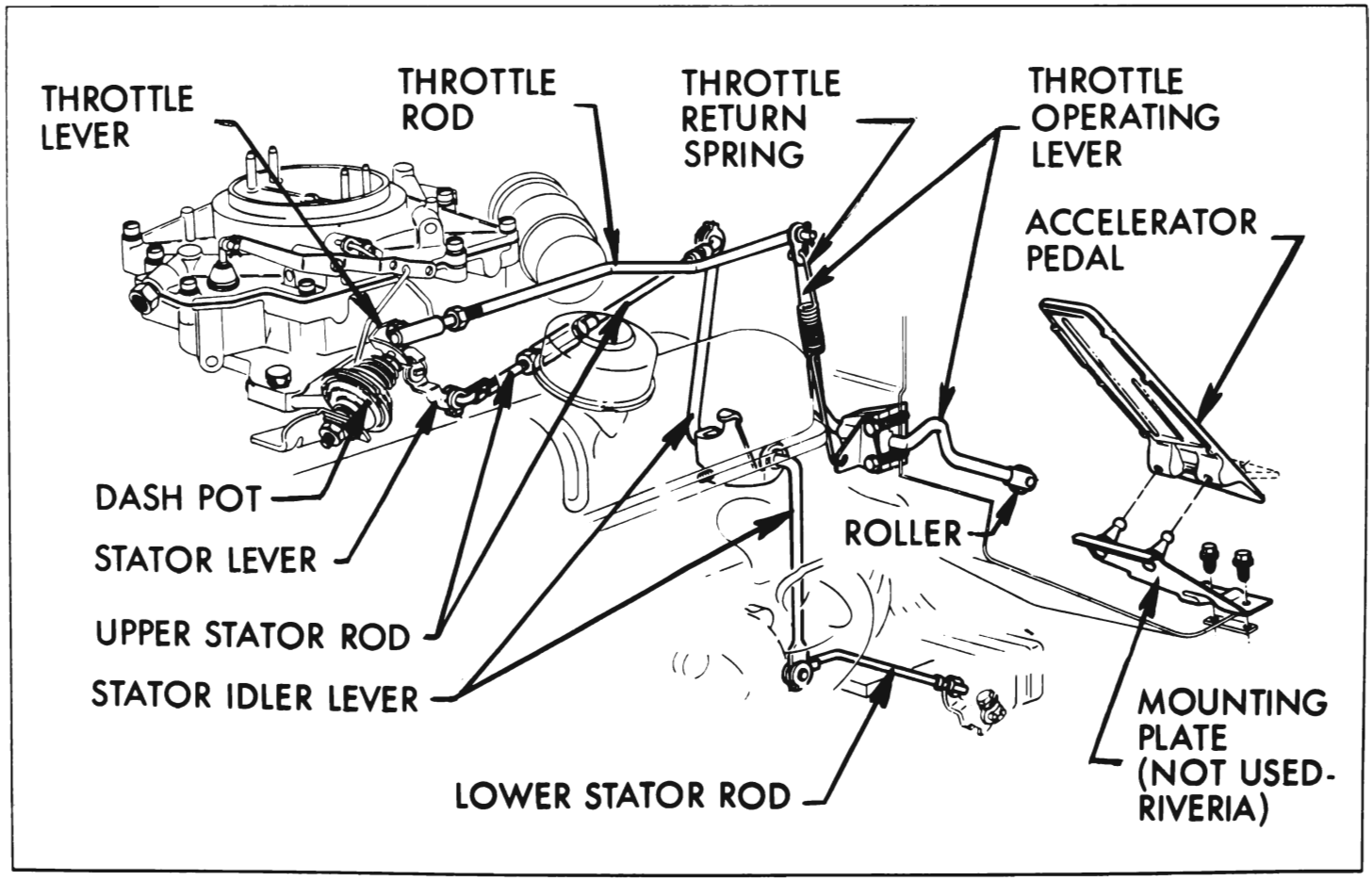


Figure 3-14—Throttle and Stator Control Linkage

closes firmly against stop screw even when throttle is closed very slowly. The desired wide open condition is to have full opening of throttle valve just as accelerator pedal strikes floor mat rather than having stop on throttle lever strike hard against boss on throttle body.

### b. Stator Linkage Adjustment

1. Move upper end of stator idler lever forward and hold against pressure of stator valve spring.

2. Move throttle lever to wide open throttle position. Throttle lever on carburetor should make contact with stator lever just as throttle reaches wide open position.

3. If there is clearance between throttle lever and stator lever, shorten stator rod as required by rotating turnbuckle.

4. If wide open throttle causes the stator idler lever upper end to bend farther forward, lengthen stator rod as required by rotating turnbuckle.

5. Tighten turnbuckle locknut and recheck stator linkage as described in Steps 1 and 2.

### c. Dash Pot Adjustment

Adjust the dash pot with the engine at normal operating temperature.

1. With transmission in park, accelerate engine at carburetor, allowing throttle to snap closed. Dash pot should delay the closing action approximately 2 seconds.

2. If dash pot delaying time is short, move dash pot toward throttle lever; if delaying time is too long, move dash pot away from throttle lever. When correct, retighten locknut. If proper control cannot be obtained by adjustment, replace the dash pot.

3. As a final check, apply brakes firmly and shift transmission into Drive. Jab accelerator pedal and release rapidly. If engine stalls, adjust dash pot to give slightly more retarding action, but no more than necessary to prevent engine stalling.

## 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. Rivieras 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 Rivieras)

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 Rivieras)

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 3-15.

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 Rivieras)

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 Rivieras)

Estate wagon and Riviera gasoline tanks are located in a completely different location - to the rear of the muffler. See Figure 3-16 or 17. 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.

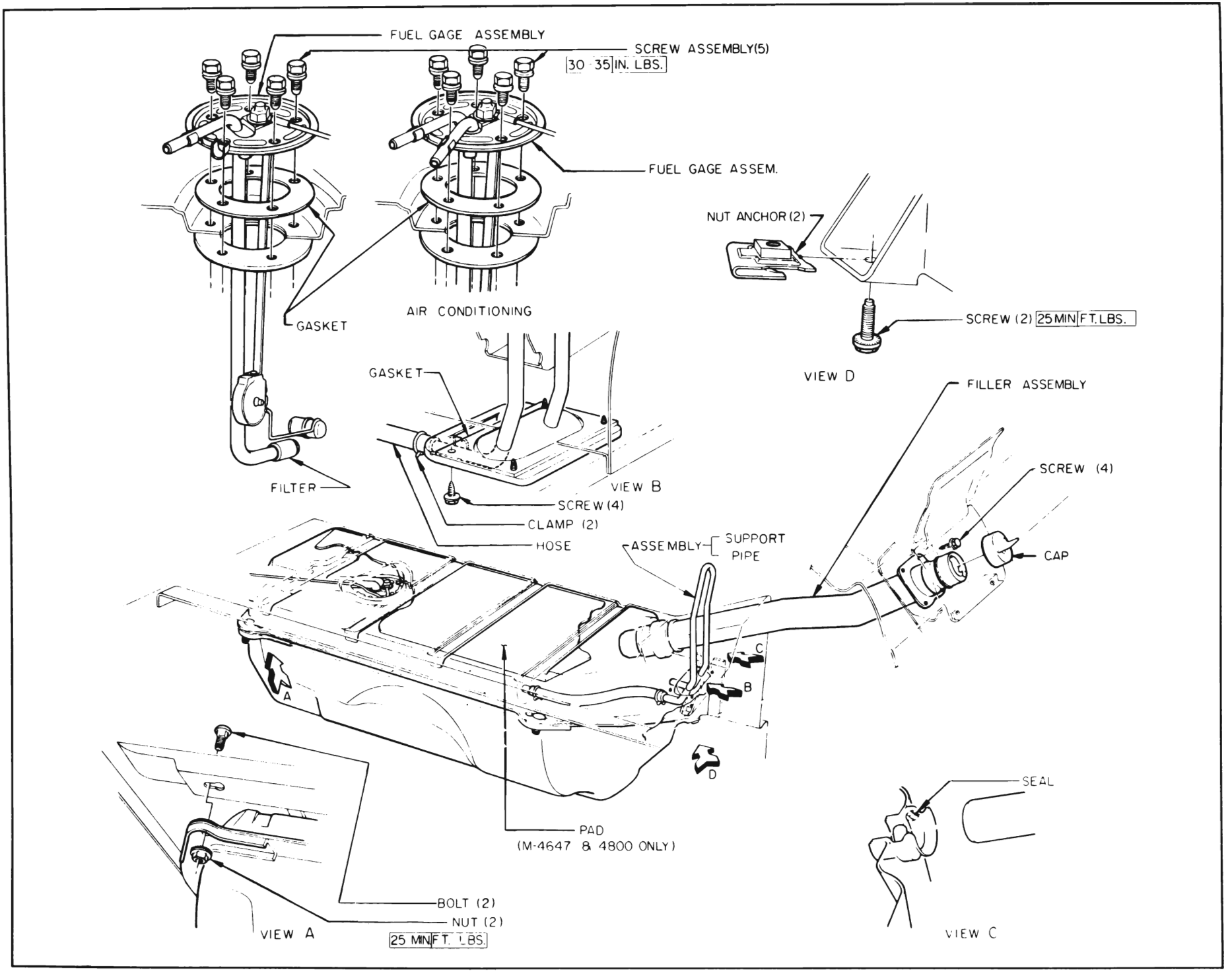


Figure 3-15—Fuel Tank

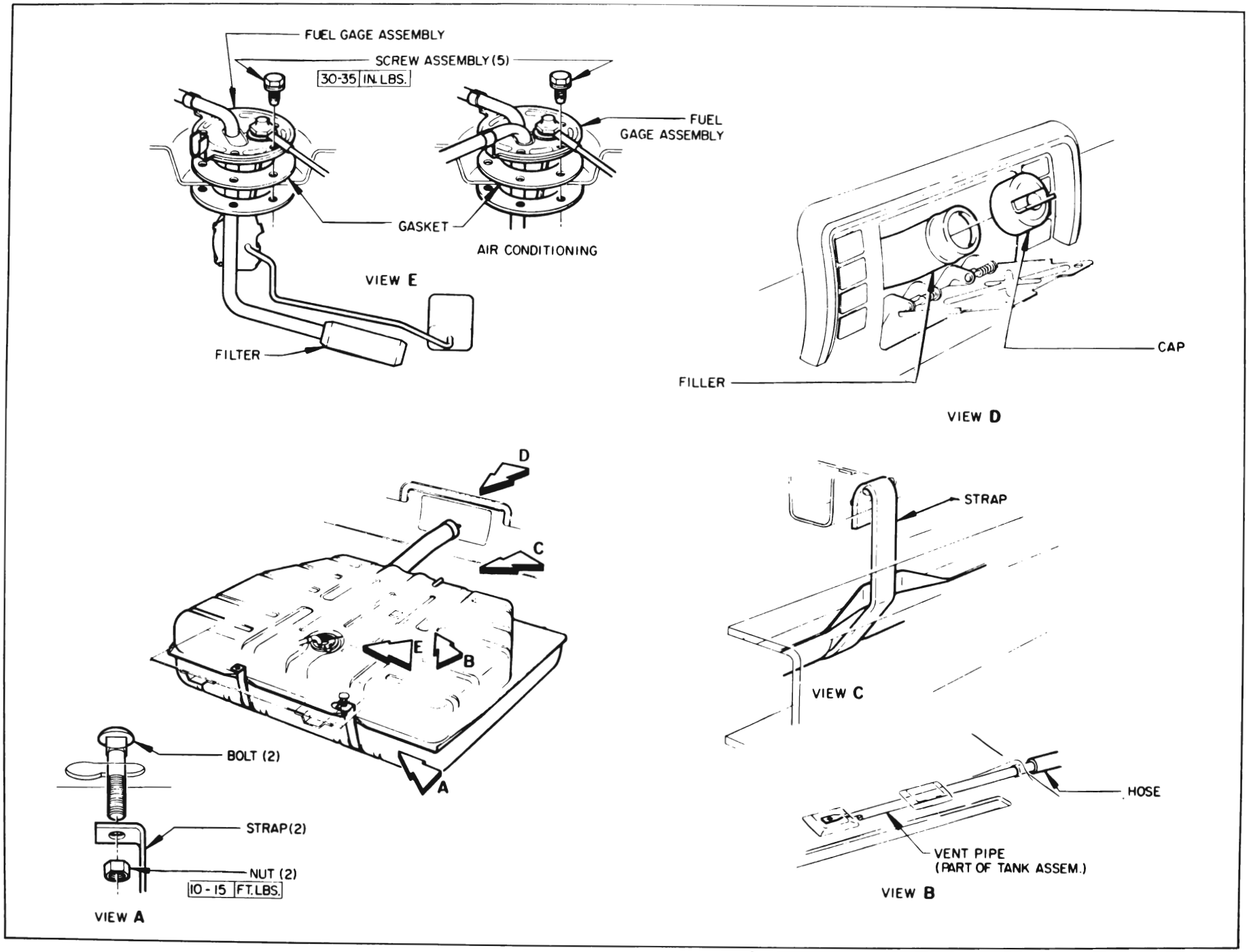


Figure 3-16—Fuel Tank—Riviera

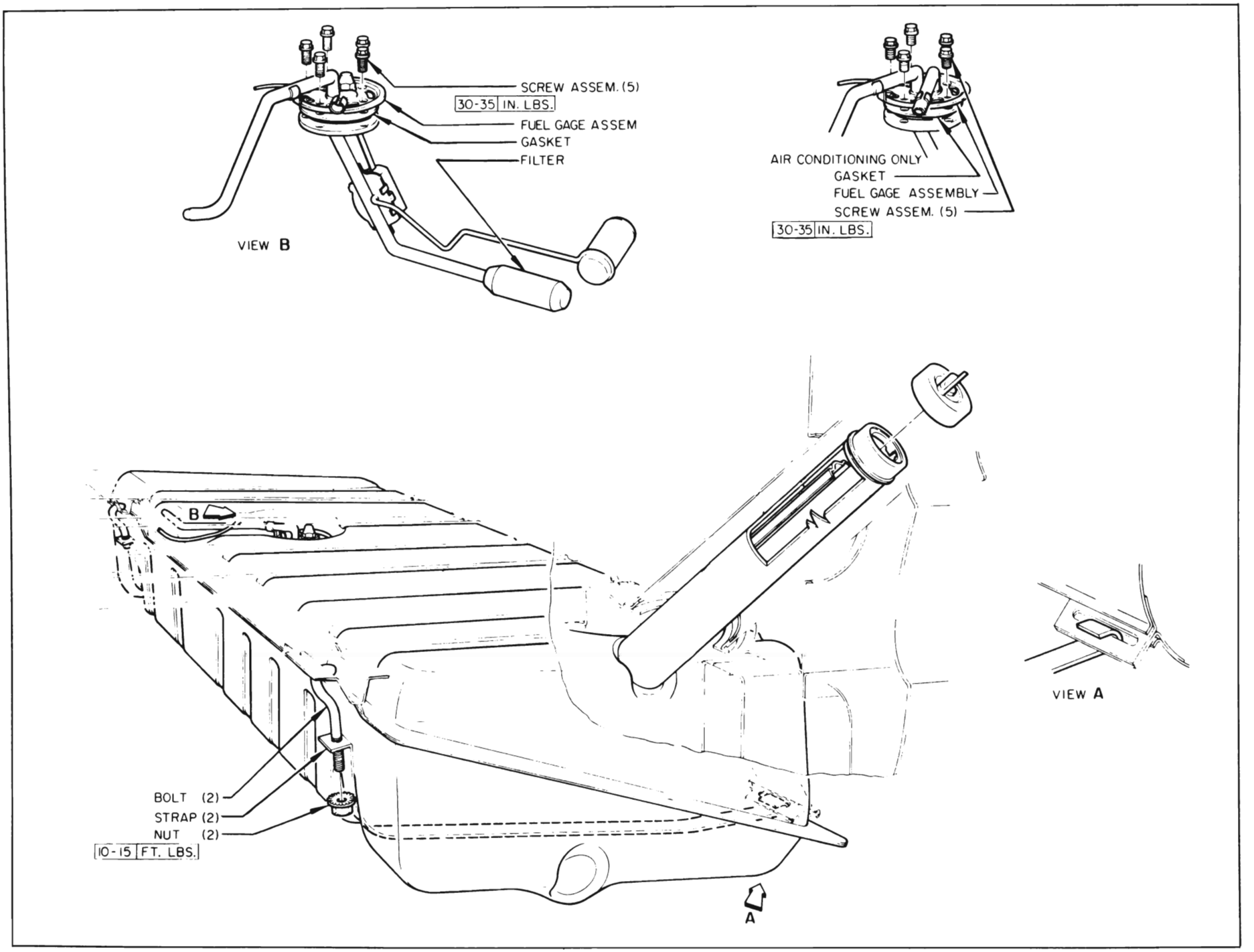


Figure 3-17—Fuel Tank—Estate Wagon