SECTION 12

FUEL SYSTEM

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12-1. FUEL SYSTEM.

12-2. DESCRIPTION. Fuel is gravity-fed from the metal wing tanks, through a shut-off valve and a fuel strainer, to the carburetor. Positive ventilation is provided by a vent line and check valve assembly located in the left wing tank and a crossover line connecting the two tanks together. The vent line from the check valve assembly extends overboard through the lower wing skin adjacent to the left wing strut. A fuel line drain is located between the shut-off valve and the strainer.

12-3. PRECAUTIONS.

NOTE

There are certain general precautions and rules concerning the fuel system which should be observed when performing the operations and procedures in this section. These are as follows:

a. During all fueling, defueling, tank purging, and tank repairing or disassembly, ground the aircraft to a suitable ground stake.

b. Residual fuel draining from lines and hose constitutes a fire hazard. Use caution to prevent the accumulation of fuel when lines or hose are disconnected.

c. Cap open lines and cover connections to prevent thread damage and the entrance of foreign matter.

NOTE

Throughout the aircraft fuel system, from the tanks to the carburetor, use NS-40 (RAS-4) (Snap-On-Tools Corp., Kenosha, Wisconsin), MIL-T-5544 (Thread Compound Antiseize, Graphite Petrolatum), USP Petrolatum or engine oil as a thread lubricator or to seal a leaking connection. Apply sparingly to male threads only, omitting the first two threads, exercising extreme caution to avoid "stringing" sealer across the end of the fitting. Always ensure that a compound, the residue from a previously used compound, or any other foreign material cannot enter the system.

12-4. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
NO FUEL TO CARBURETOR.	Fuel shut-off valve not turned on.	Turn valve on. (Safety in ON position.)
	Fuel tanks empty.	Service with proper grade and amount of fuel.
	Fuel line disconnected or broken.	Connect or repair fuel lines.
	Inlet elbow or inlet screen in carburetor plugged.	Clean and/or replace.
	Fuel tank outlet strainers plugged.	Remove and clean strainers and flush out fuel tanks.
	Defective fuel shut-off valve.	Replace shut-off valve.
	Plugged fuel strainer.	Remove and clean strainer and screen.
	Fuel line plugged.	Clean out or replace fuel line.
FUEL STARVATION AFTER STARTING.	Partial fuel flow from the preceding causes.	Use the preceding remedies.
	Plugged fuel vent.	See paragraph 12-11.
	Water in fuel.	Drain fuel tank sumps, fuel lines and fuel strainer.
NO FUEL QUANTITY INDICATION.	Fuel tanks empty.	Service with proper grade and amount of fuel.
	Blown fuse.	Replace blown fuse.
	Loose connections or open circuit.	Tighten connections; repair or replace wiring. Refer to Section 20.
	Defective fuel quantity indicator or transmitter.	Refer to Section 15.
PRESSURIZED FUEL TANK	Plugged bleed hole in fuel vent.	Check per paragraph 12-11.

SHOP NOTES:

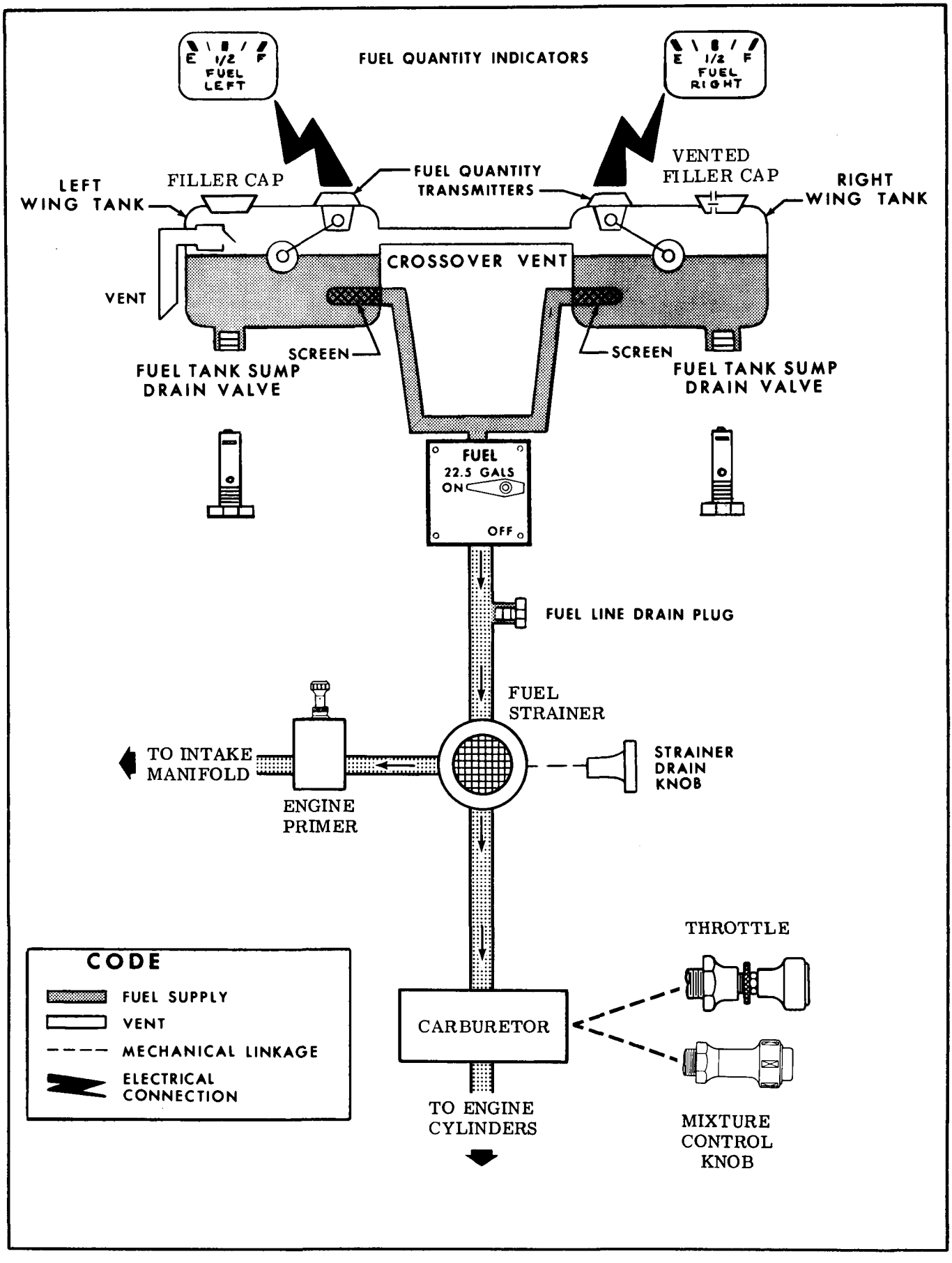


Figure 12-1. Fuel System Schematic

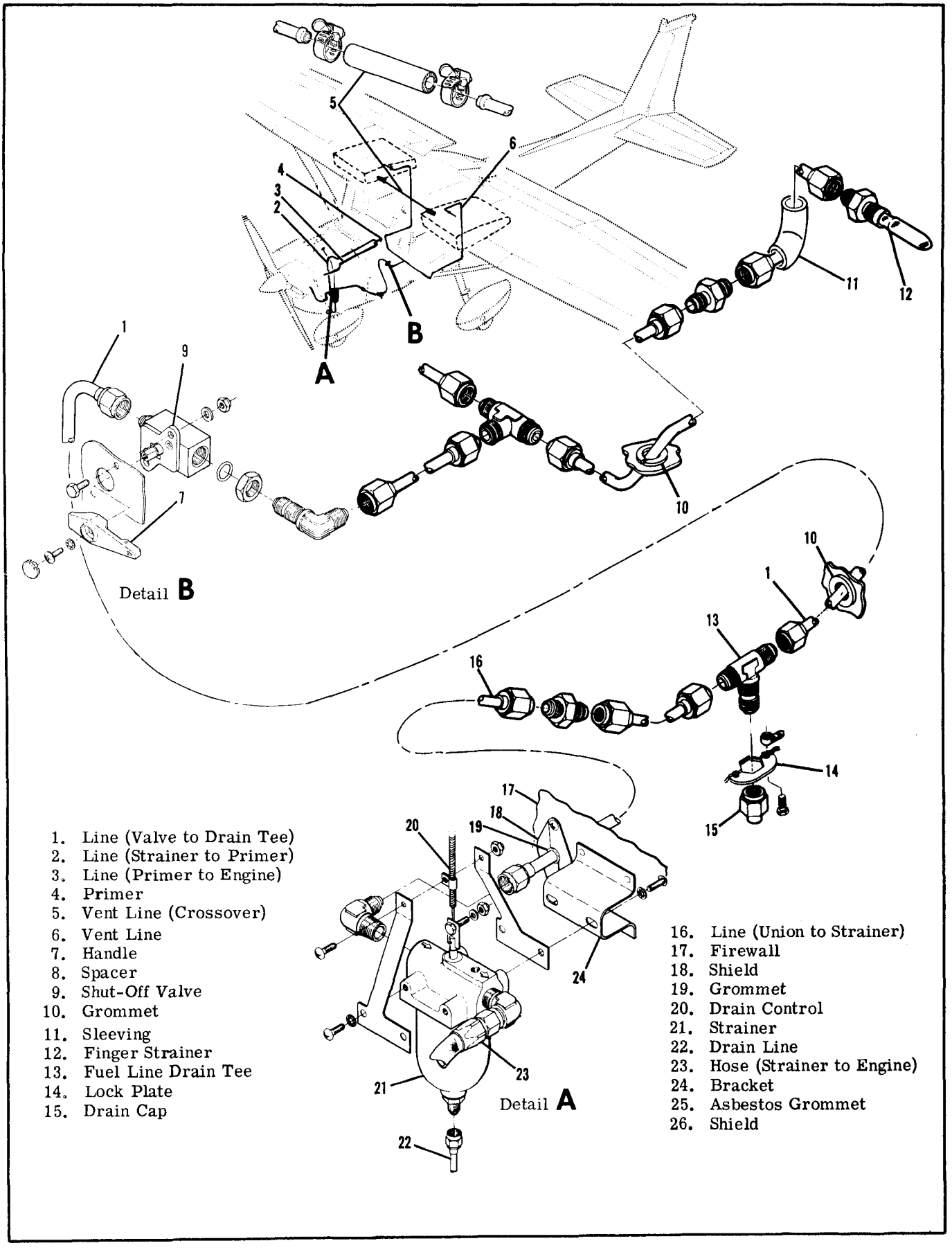
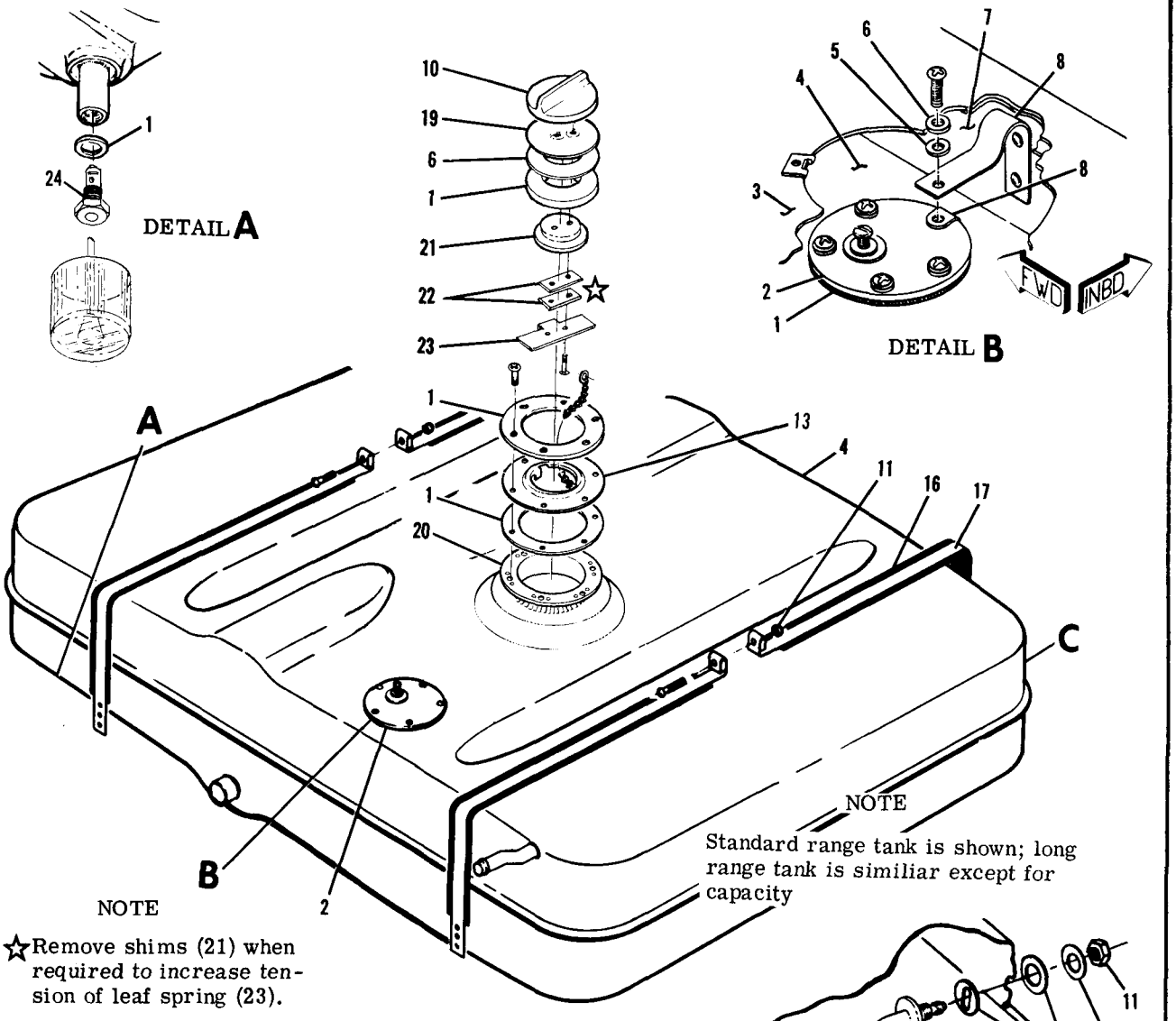


Figure 12-2. Fuel System



1. Gasket
2. Transmitter
3. Wing Skin
4. Fuel Tank
5. Cork Washer
6. Washer
7. Wing Root Rib
8. Ground Strap
9. Screw
10. Cap
11. Nut
12. Valve
13. Filler Neck
14. Seal
15. Adapter
16. Pad
17. Strap
18. Plug
19. Plate
20. Adapter
21. Spacer
22. Shim
23. Leaf Spring
24. Drain Valve

Figure 12-3. Fuel Tank

12-5. FUEL TANKS.

12-6. DESCRIPTION. A rigid metal tank is installed in the inboard panel of each wing. Sump drain plugs or valves, one in each tank, are provided for draining trapped water and sediment.

12-7. REMOVAL AND INSTALLATION.

a. Remove sump drain plug or valve and drain fuel from applicable tank. (Observe precautions outlined in paragraph 12-3.)

b. Remove fuel tank cover by removing attaching screws.

c. Remove wing root fairings.

d. Disconnect and plug or cap all fuel and vent lines from tank. Remove fittings as necessary for clearance when removing tank.

e. Disconnect electrical lead and ground strap from fuel quantity transmitter.

f. Disconnect straps securing fuel tank and remove tank. Use care to avoid damage to protruding fittings and hose connections when removing the tank.

g. To install tank, reverse the preceding steps. Be sure grounding is secure in accordance with figure 12-3.

12-8. FUEL QUANTITY TRANSMITTERS. Fuel quantity transmitters are installed in the top of fuel tanks. A complete description, along with procedures for removal, installation and adjustment are contained in Section 15.

12-9. FUEL VENTS.

12-10. DESCRIPTION. A vent line is installed in the outboard end of the left fuel tank and extends overboard down through the lower wing skin. The inboard end of the vent line extends into the fuel tank, then forward and slightly upward. A vent valve is installed on the inboard end of the vent line inside the fuel tank, and a crossover vent line connects the two tanks for positive ventilation.

12-11. CHECKING. Field experience has demonstrated that the fuel vent can become plugged, with possible fuel starvation of the engine or collapse of the fuel tanks. Also, the bleed hole in the vent valve assembly could possibly become plugged, allowing pressure from expanding fuel to pressurize the tanks. The following procedure may be used to check the vent and bleed hole in the valve assembly.

a. Attach a rubber tube to the end of vent line beneath the wing.

b. Blow into tube to slightly pressurize the tanks. If air can be blown into tanks, vent line is open.

c. After tank is slightly pressurized, insert end of rubber tube into a container of water and watch for a continuous stream of bubbles, which indicates the bleed hole in valve assembly is open and relieving pressure.

d. After completion of step "c", blow into tube again to slightly pressurize the tank, and loosen, but do not remove filler cap on opposite wing to check tank crossover line. If pressure escapes from filler cap, crossover line is open.

NOTE

Remember that a plugged vent line or bleed hole can cause either fuel starvation and collapsing of fuel tanks or the pressurization of tanks by fuel expansion.

e. Any fuel vent found plugged or restricted must be corrected prior to returning aircraft to service.

NOTE

The fuel vent line protruding beneath the wing near the wing strut must be correctly aligned to avoid possible icing of the vent tube. Dimensions are shown in figure 12-4.

12-12. FUEL SHUT-OFF VALVE. (See figure 12-2.)

12-13. DESCRIPTION. The fuel shut-off valve is a two-position ON-OFF valve, located in the floor area between the pilot and copilot positions. Thru 1972 Models, the handle is safetied to the lower mounting bolt. Beginning with 1973 Models, the handle is safetied to a bolt, located in the floorboard. The handle is safetied in the "ON" position with .018" diameter mild steel wire (tag wire), which will break easily if the handle must be turned OFF in an emergency. It is recommended that the valve be replaced and not repaired.

12-14. REMOVAL AND INSTALLATION.

a. Completely drain all fuel from wing tanks, fuel lines, strainer, and shut-off valve. (Observe the precautions in paragraph 12-3.)

b. Remove shut-off valve handle.

c. Remove copilot's seat and access plate under seat.

d. Disconnect and cap all fuel lines at shut-off valve.

e. Remove bolts attaching shut-off valve and remove valve.

f. Reverse the preceding steps for installation. Safety wire valve handle in "ON" position.

12-15. FUEL STRAINER. (See figure 12-5.)

12-16. DESCRIPTION. The fuel strainer is mounted at the firewall in the lower engine compartment. The strainer is equipped with a quick-drain valve which provides a means of draining trapped water and sediment from the fuel system. The quick-drain control is located adjacent to the oil dipstick and is accessible through the oil dipstick door.

NOTE

The fuel strainer can be disassembled, cleaned and reassembled without removing the assembly from the aircraft. (Refer to paragraph 12-20.)

12-17. DISASSEMBLY AND ASSEMBLY. (See figure 12-5.)

a. Remove drain tube, safety wire, nut and washer at bottom of filter bowl, and remove bowl.

b. Carefully unscrew standpipe and remove.

c. Remove filter screen and gasket. Wash filter screen and bowl with solvent (Federal Specification

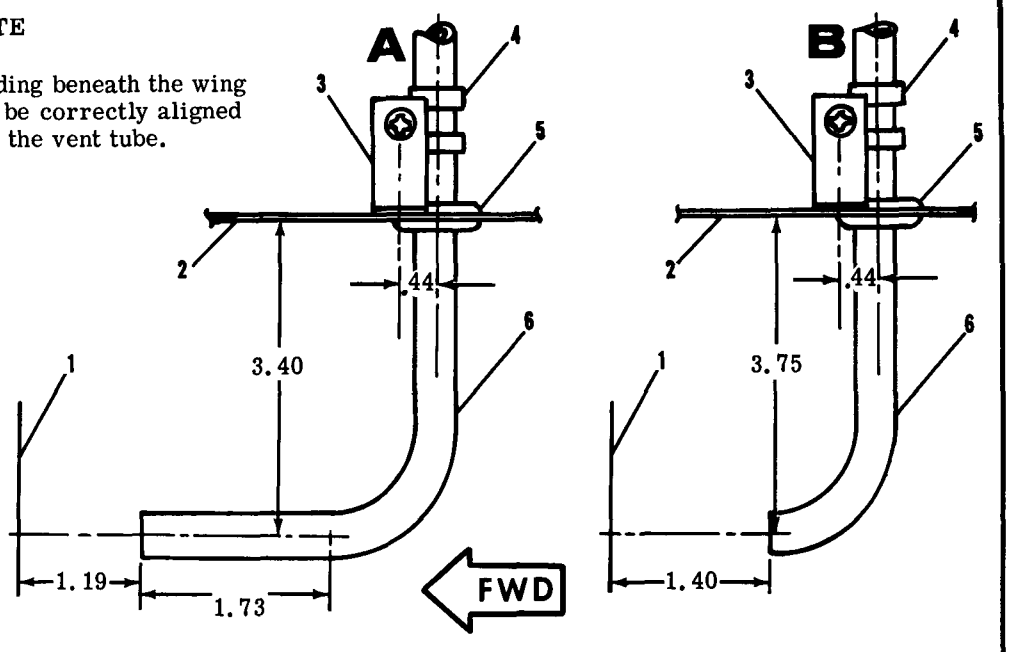
NOTE

The fuel vent line protruding beneath the wing near the wing strut must be correctly aligned to avoid possible icing of the vent tube.

A 150 AND F150

B A150 AND FA150

1. Wing Strut
2. Wing Skin
3. Bracket
4. Clamp
5. Grommet
6. Vent Tube



VENT LINE MUST BE PARALLEL TO WING CHORD LINE. TOLERANCE UP 5°, DOWN 0°.

Figure 12-4. Fuel Vent Location

P-S-661, or equivalent) and dry with compressed air.

d. Using a new gasket between filter screen and top assembly, install screen and standpipe. Tighten standpipe only finger tight.

e. Using all new O-rings, install bowl. Note that step-washer at bottom of bowl is installed so that step seats against O-ring.

f. Turn shut-off valve to "ON" position, check for leaks and proper operation.

g. Torque bottom nut (15) to 25-30 lb-in., and safety wire to top assembly of strainer. Wire must have right-hand wrap, at least 45 degrees.

h. Connect drain tube.

12-18. PRIMING SYSTEM. (See figure 12-2.)

12-19. DESCRIPTION. The priming system is comprised of a manually-operated primer located on the instrument panel, and a line from the primer to the intake manifold. Operation of the plunger forces fuel directly into the engine intake manifold.

12-20. REMOVAL AND INSTALLATION.

a. Disconnect and cap all lines at primer.

b. Unscrew knurled nut and remove plunger from pump body.

c. Remove pump body from instrument panel.

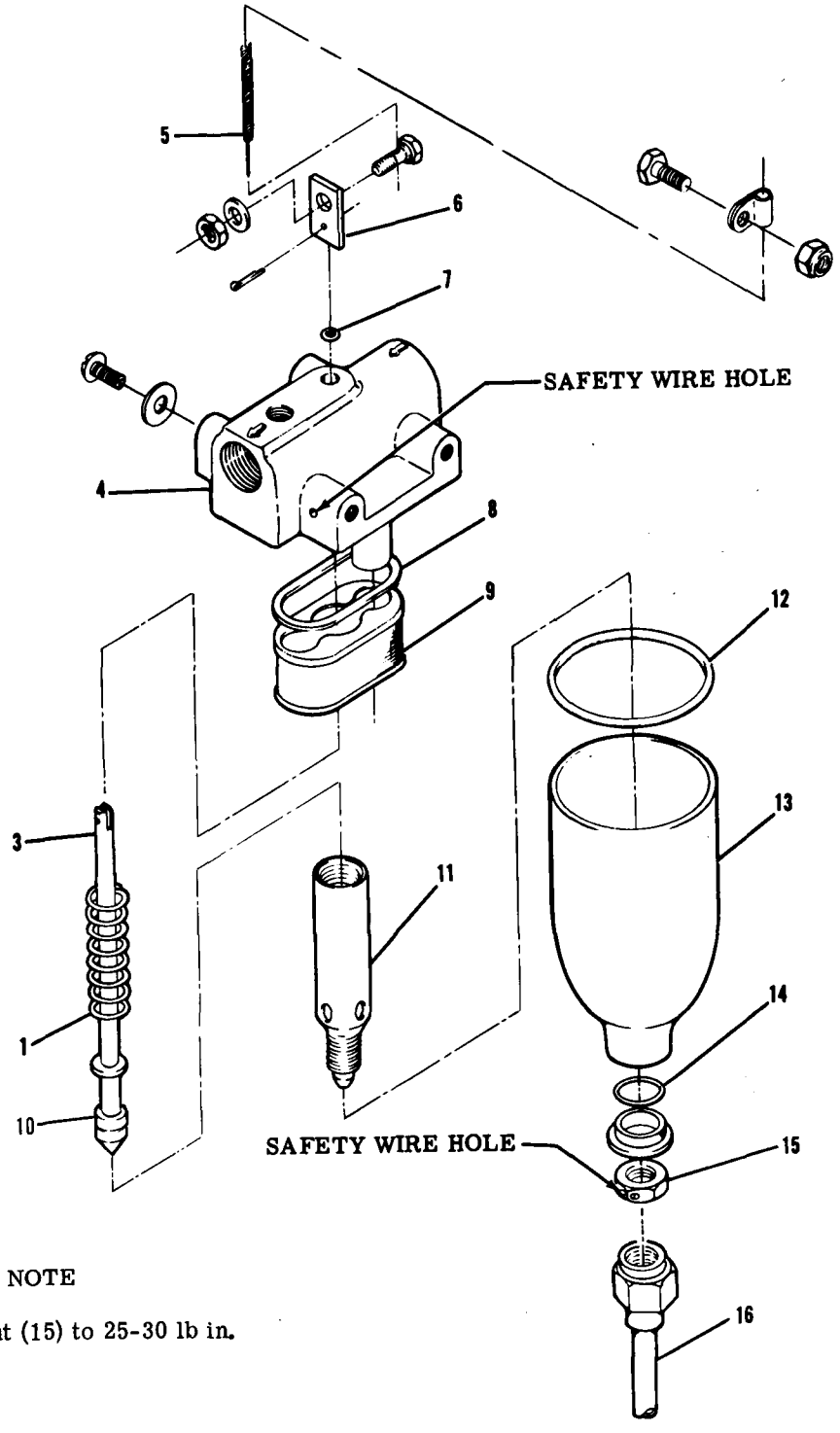
NOTE

Visually inspect primer lines for crushed, kinked, or broken condition. Ensure proper clamping to prevent fatigue due to vibration and chafing.

d. Prior to installing a primer, check for proper pumping action and positive fuel shut-off in the locked position.

e. Reverse preceding steps for installation.

SHOP NOTES:



NOTE

Torque nut (15) to 25-30 lb in.

1. Spring
2. Washer
3. Plunger
4. Top
5. Drain Control
6. Plate
7. O-Ring
8. Gasket
9. Filter
10. Collar
11. Standpipe
12. O-Ring
13. Bowl
14. O-Ring
15. Nut
16. Drain Line

Figure 12-5. Fuel Strainer