

SECTION 4

WINGS, BOOMS, AND EMPENNAGE

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4-1. WINGS.

4-2. DESCRIPTION. The wings are all-metal external lift strut braced wing panels of semi-monocoque construction. Wing structure consists of a forward and rear spar, ribs for attachment of the skin and a integral boom support structure.

4-3. REMOVAL AND INSTALLATION.

- a. Remove the wing to fuselage, strut and aft boom fairings for the wing being removed.
- b. Drain all fuel from aircraft.
- c. Remove empennage as a unit from tail booms. (See paragraph 4-12.)
- d. Remove tail boom from wing being removed. (See paragraph 4-9.)
- e. Disconnect and remove parts of fuel selector valve control as necessary to remove wing. Refer to Section 11 for details of selector valve control.
- f. Disconnect aileron carry-thru cable at turnbuckle above cabin headliner and pull cable into wing root area.
- g. Disconnect applicable flap cables from actuator above cabin headliner rear access opening. Remove cable guards and pulleys as necessary to pull cables into wing root area.

NOTE

It is recommended to secure flap in streamlined position with tape during wing removal to prevent damage, since flap will swing freely.

- h. Disconnect flexible hoses, plumbing, electrical wiring, and any other items that would interfere with wing removal, at or near the wing root area.
- i. Support opposite wing as a safety precaution. Support wing being removed.

**CAUTION**

If cables routing through wing strut were not pulled from wing during boom removal, do so before detaching strut. Refer to paragraph 4-6 and figure 4-2 for wing strut removal.

- j. Detach wing strut from wing being removed.
- k. Detach wing from fuselage and place on padded

wing stand.

NOTE

Figure 16-5 illustrates wing and fuselage support stands which can be manufactured locally of any suitable wood.

1. Reverse the preceding steps to install the wing. Rig fuel selector valve control and flight control systems in accordance with procedures outlined in the applicable Sections of this Service Manual.

NOTE

Torque wing-to-boom and boom-to-empennage attaching screws to values shown in figure 4-3.

- m. Refuel aircraft and check for leaks. Check operation of all systems and equipment that may have been affected by wing removal.

4-4. WING STRUTS.

4-5. DESCRIPTION. Each wing has a single lift strut which transmits a part of the wing load to the lower portion of the fuselage. The strut consists of an aluminum "I" shaped extrusion with forged fittings at each end for attachment to the wing and lower fuselage. Cable guides are attached to the front and rear of the strut for control cable routing. Each strut assembly is covered with a elliptical shaped fairing and a cup fairing at each end.

4-6. REMOVAL AND INSTALLATION.

- a. Remove screws from lower strut cup fairing.
- b. Pull upper strut cup fairing from recess in boom support.
- c. When removing left hand strut disconnect pitot line, also pitot heater wiring if installed.
- d. Remove screws from strut fairing and remove fairing.
- e. Disconnect control cables at turnbuckles and pull cables out of cable guides.
- f. Place support under wing and remove upper and lower attaching bolts. Then remove strut.
- g. To install reverse this procedure. Rig in accordance with Sections 6, 7, 8 and 9.

#### 4-7. BOOMS.

4-8. DESCRIPTION. Tail booms are elliptical in section and constructed of formed bulkheads, extruded stringers and stressed skins. Cables, electrical wiring, and plumbing for various equipment is routed through the boom structure. (See figure 4-3.)

#### 4-9. REMOVAL AND INSTALLATION.

- a. Remove empennage from booms as a unit. (See paragraph 4-12.)
- b. If right boom is being removed, disconnect flap/elevator trim interconnect at trim cable and at clamps inside the boom. Also disconnect the rudder cable.
- c. If left boom is being removed, disconnect elevator and rudder cables and any other items that would interfere with boom removal.
- d. Remove aft boom-to-wing fairings.
- e. Support boom and remove attaching screws. Pull boom aft and work cables and electrical wiring out of the boom.
- f. Reverse this procedure to install booms. Refer to figure 4-3 for torque values for boom attachment screws. Rig control systems as necessary. Refer to Sections 8 and 9.

#### 4-10. EMPENNAGE.

4-11. DESCRIPTION. The empennage is of conventional aluminum all metal design consisting of a horizontal stabilizer, elevator, dual ventral fin and dual fin and rudder.

#### 4-12. REMOVAL AND INSTALLATION.

##### NOTE

The empennage should always be removed from the tail booms instead of removing the booms with the empennage attached to them, because of the possibility of twisting or otherwise distorting the stabilizer.

- a. Remove stabilizer fairings, also fin, boom and stabilizer cover plates as needed for access to control cables.
- b. Disconnect elevator trim tab cables at turnbuckles in the right boom.
- c. Release tension on rudder cables at the turnbuckle located in the stabilizer, then disconnect rudder cables at the bellcranks inside each end of the stabilizer.
- d. Remove cable guards and pulleys as necessary to pull cables forward of boom-to-empennage junction.
- e. Unhook elevator downspring in left vertical fin (thru Model 337-0755). Release tension on the elevator cables at the turnbuckles located in the left hand wing strut. Then disconnect the cables from the bellcrank located in the left fin.
- f. Remove cable guards and pulleys as necessary to pull the cables forward of the boom-to-empennage junction.
- g. Disconnect all electrical wires routed through boom to empennage.
- h. Check for and disconnect any other items that would interfere with empennage removal.
- i. Support empennage, remove attaching screws,

and pull empennage aft to remove.

j. Reverse this procedure to install the empennage. Torque boom-to-empennage attaching screws to values shown in figure 4-3.

k. Rig control surfaces as necessary. Refer to Sections 8 and 9.

l. Check operation of flashing beacon and tail navigation lights.

#### 4-13. VERTICAL FIN.

4-14. DESCRIPTION. The fins are of all-metal construction consisting of a forward and rear spar with ribs for attachment of the skin and rudder attachment brackets. The left fin houses the elevator bellcrank. A elevator balance weight is located in each fin. (See figure 4-4.)

#### 4-15. REMOVAL AND INSTALLATION.

- a. Remove the empennage in accordance with paragraph 4-12.
- b. Remove the rudder in accordance with Section 9.
- c. Remove the elevator in accordance with Section 8.
- d. If right fin is being removed, pull elevator trim cables aft into area between fin and stabilizer.
- e. Remove pulleys and cable guards as necessary.
- f. Check for and disconnect any other items that would interfere with fin removal.
- g. Support fin and remove forward and rear spar attaching bolts, then pull the fin outboard to remove.
- h. Reverse this procedure to install the fins.
- i. Rig control systems as necessary. (Refer to Sections 8 and 9.)

#### 4-16. HORIZONTAL STABILIZER.

4-17. DESCRIPTION. The horizontal stabilizer is of all-metal construction, consisting of a forward and rear spar with ribs for the attachment of the skin. The elevator trim tab actuator and both rudder bellcranks are located inside the stabilizer. (Refer to figure 4-5.)

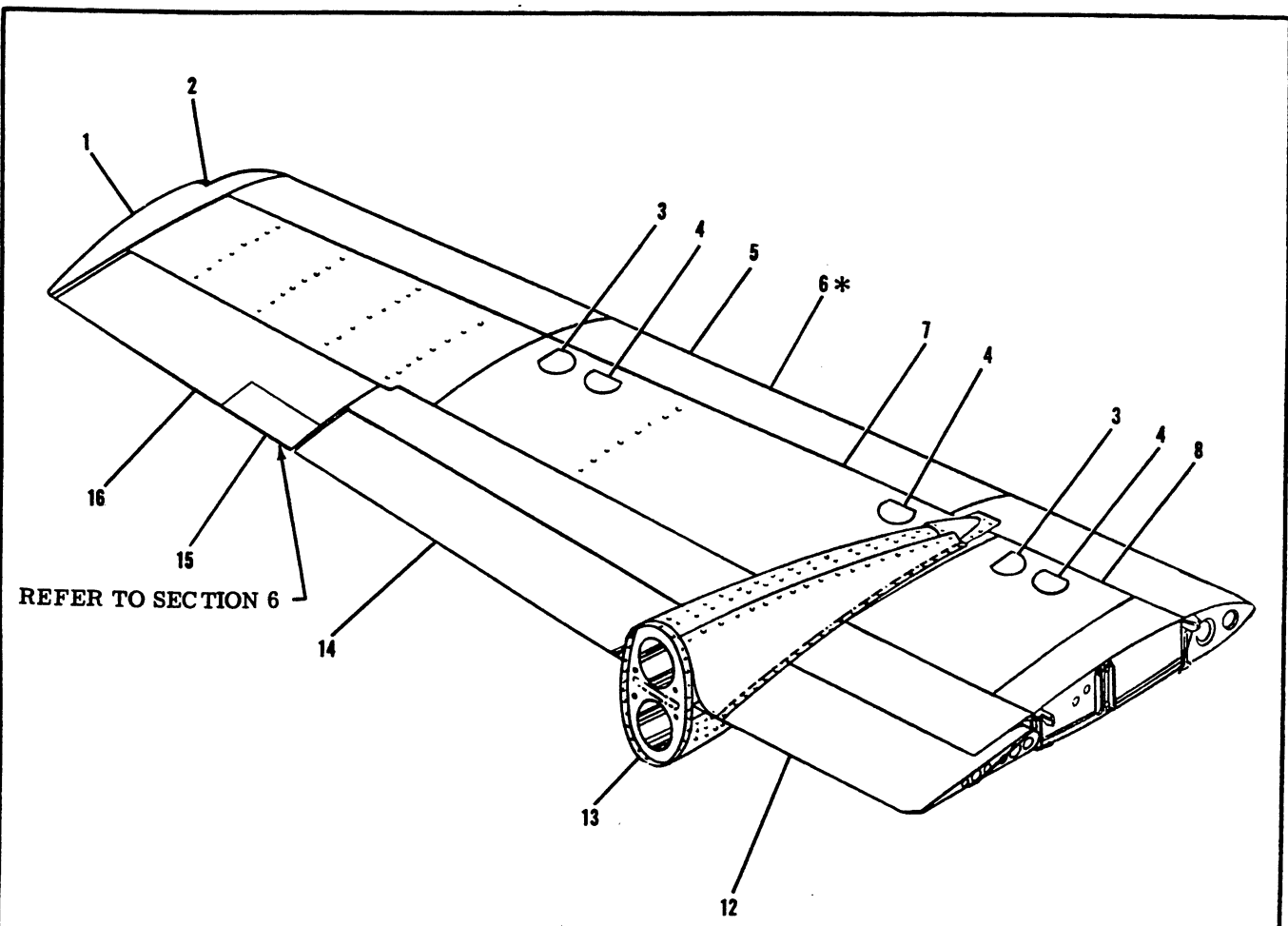
#### 4-18. REMOVAL AND INSTALLATION.

- a. Remove the empennage in accordance with paragraph 4-12.
- b. Remove the elevator and rudder in accordance with Sections 8 and 9.
- c. Remove the vertical fin in accordance with paragraph 4-15.
- d. To install the stabilizer reverse this procedure and rig in accordance with Sections 8 and 9.

#### 4-19. MOORING RINGS.

4-20. DESCRIPTION. Thru aircraft serial 337-0755 eye-bolt type mooring rings were installed in both wings and booms. Beginning with aircraft serial 337-0756, retractable mooring rings are installed in the wings and booms.

4-21. REMOVAL AND INSTALLATION. Refer to figure 4-6 for removal and installation.

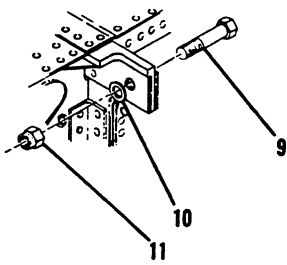


REFER TO SECTION 6

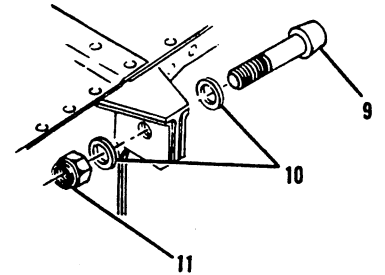
\* 1968 MODEL 337C-SERIES & ON

**NOTE**

Recessed areas around rivet heads on the leading edge of the wing are filled with Bontite No. BTO-20, or equivalent compound.



REAR SPAR ATTACHMENT



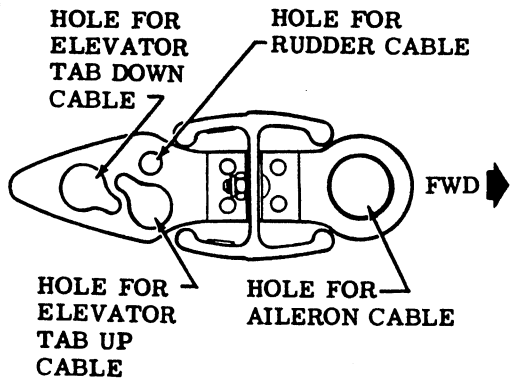
FRONT SPAR ATTACHMENT

- |                                 |                            |
|---------------------------------|----------------------------|
| 1. Wing Tip                     | 9. Bolt                    |
| 2. Navigation Light             | 10. Washer                 |
| 3. Fuel Filler Access Door      | 11. Nut                    |
| 4. Fuel Transmitter Access Door | 12. Inboard Flap           |
| 5. Landing and Taxi Lights      | 13. Boom Support Structure |
| 6. Stall Strip                  | 14. Outboard Flap          |
| 7. Main Fuel Tank Cover         | 15. Aileron Trim Tab       |
| 8. Auxiliary Fuel Tank Cover    | 16. Aileron                |

Figure 4-1. Wing

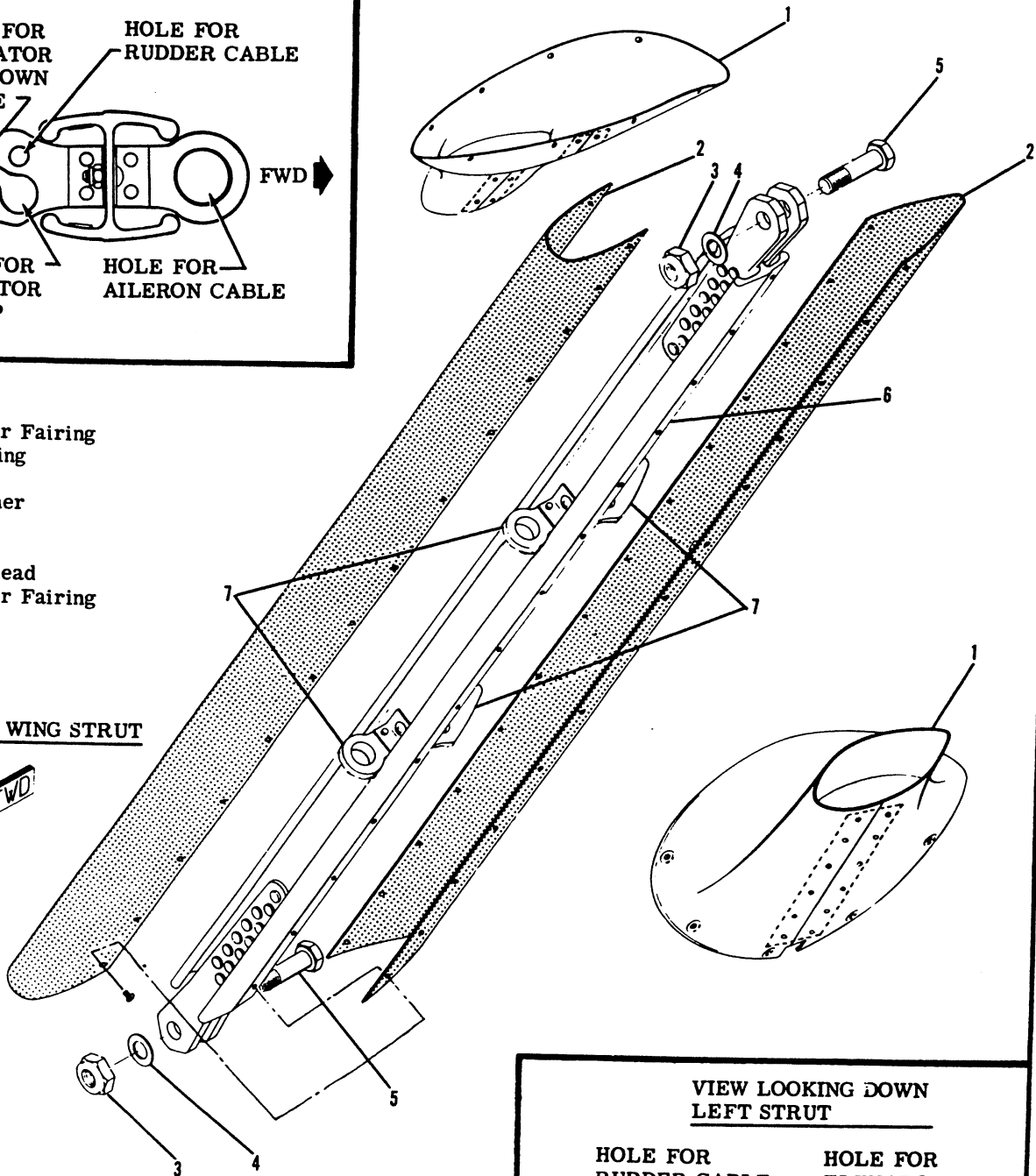
THRU AIRCRAFT SERIALS 33701462 AND F33700055

**VIEW LOOKING DOWN  
RIGHT STRUT**



- 1. Upper Fairing
- 2. Fairing
- 3. Nut
- 4. Washer
- 5. Bolt
- 6. Strut
- 7. Fairlead
- 8. Lower Fairing

**LEFT WING STRUT**



**NOTE**

Before installing a strut, slide upper and lower fairings on strut. However, the fairings may be removed and replaced without removing the strut, since they are split, then riveted to a doubler and sealed with Presstite No. 579.6 sealer.

**VIEW LOOKING DOWN  
LEFT STRUT**

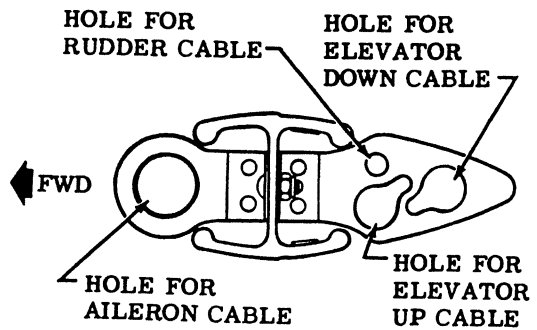
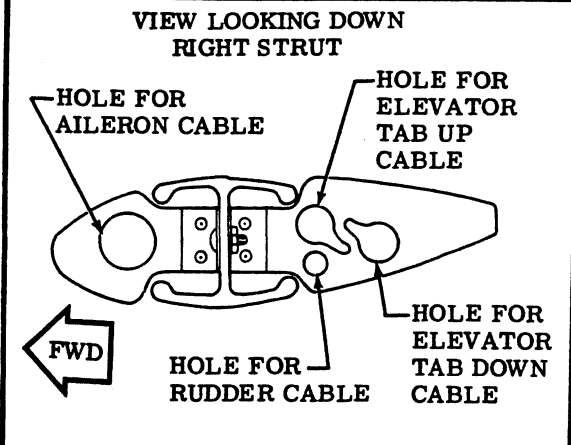


Figure 4-2. Wing Strut (Sheet 1 of 2)



**NOTE**

Before installing a strut, slide upper and lower fairing on strut. However, the fairing may be removed and replaced without removing the strut, since they are split, then riveted to a doubler and sealed with Presstite No. 579.6 sealer.

**BEGINNING WITH AIRCRAFT SERIALS  
33701463 AND F33700056**

**LEFT WING STRUT**

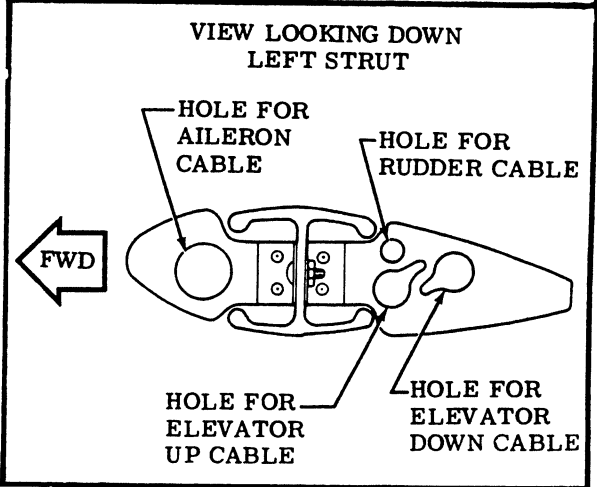
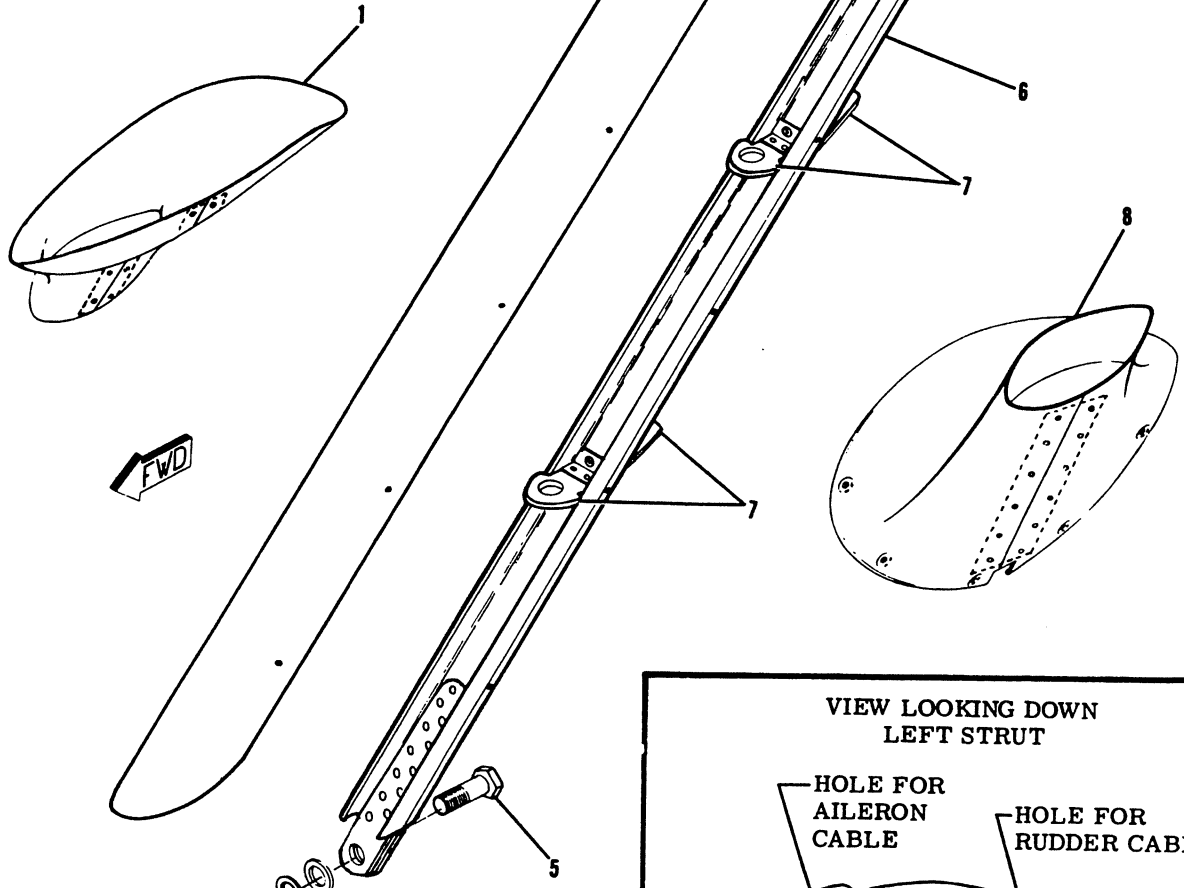


Figure 4-2. Wing Strut (Sheet 2 of 2)

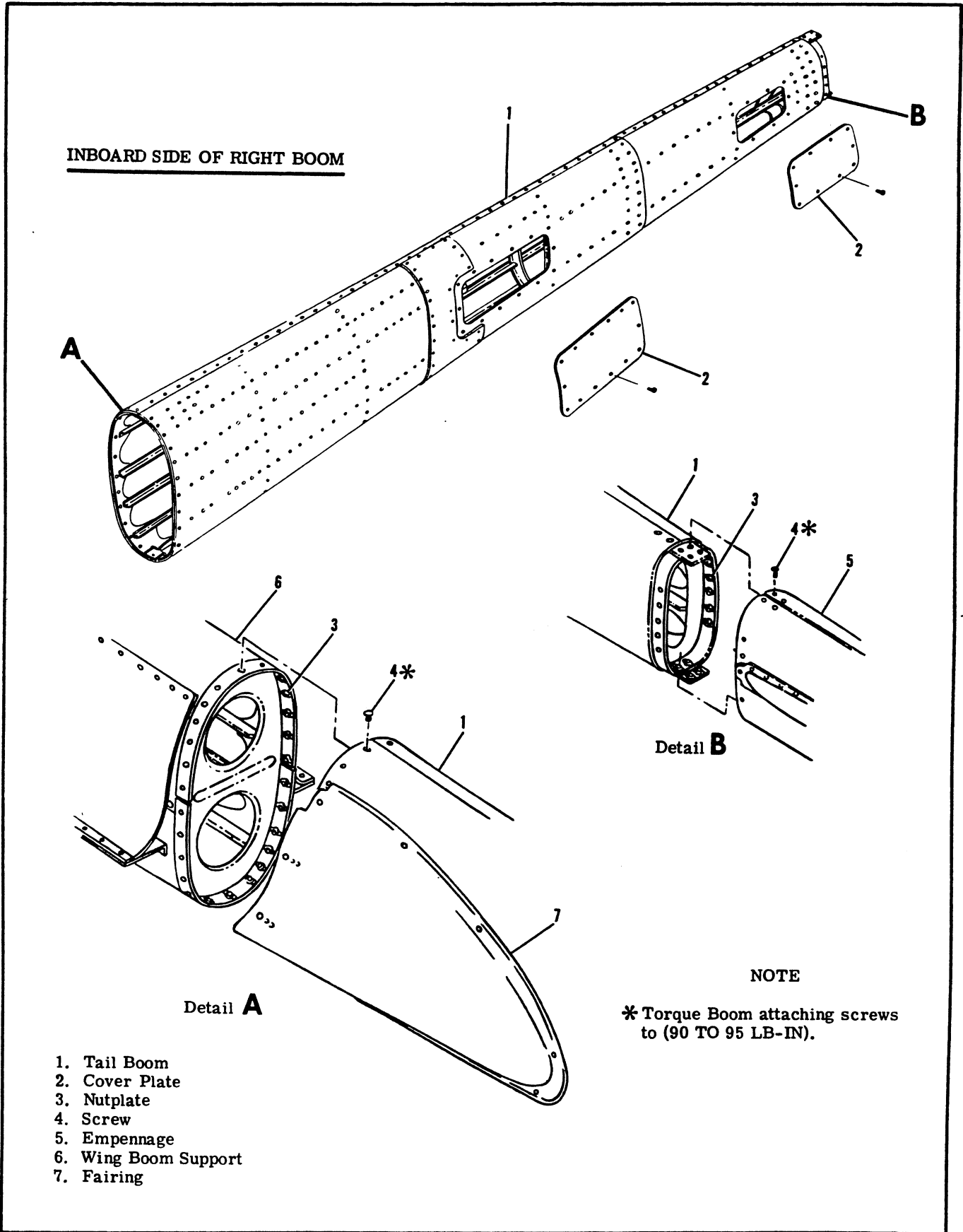
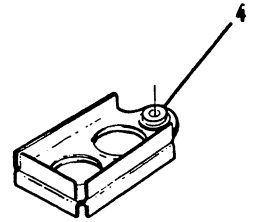
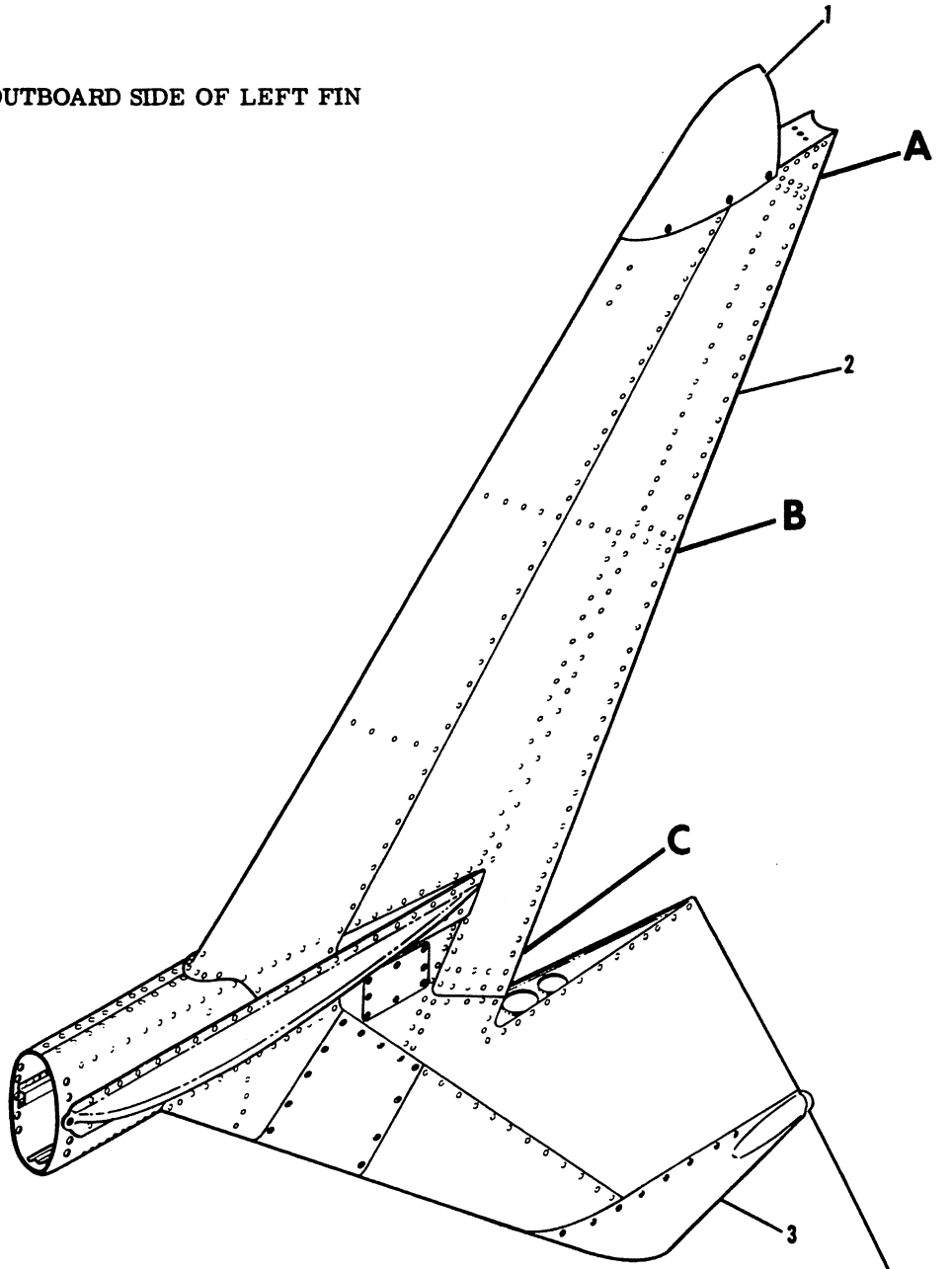
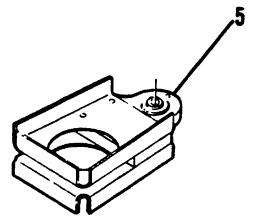


Figure 4-3. Tail Booms

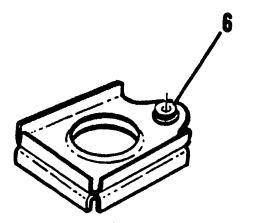
OUTBOARD SIDE OF LEFT FIN



Detail A



Detail B



Detail C

- 1. Upper Tip
- 2. Fin
- 3. Lower Tip
- 4. Upper Bearing
- 5. Middle Bearing
- 6. Lower Bearing

DUMMY NAVIGATION LIGHT (LEFT TIP)  
NAVIGATION LIGHT (RIGHT TIP ONLY)

Figure 4-4. Vertical Fin

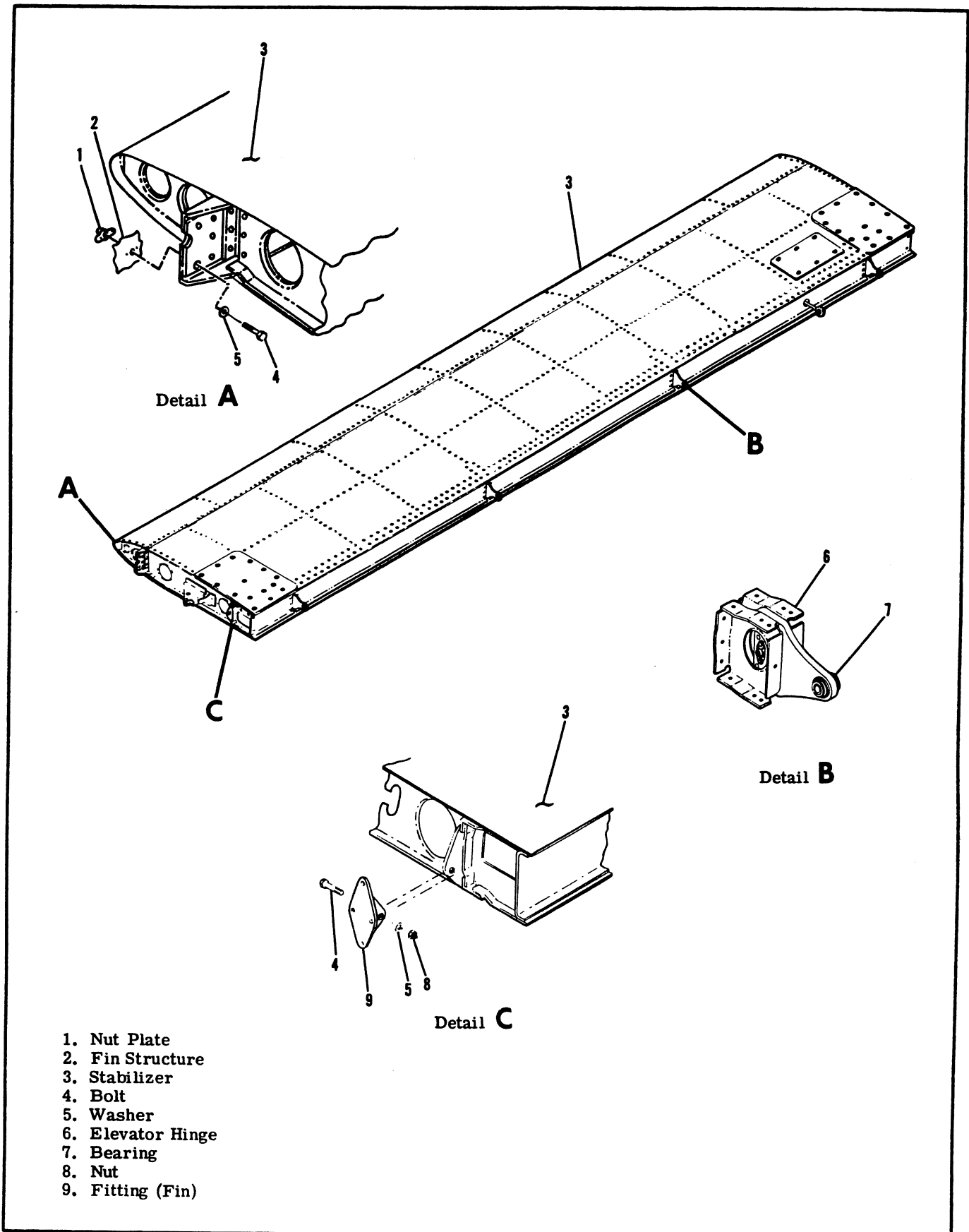


Figure 4-5. Horizontal Stabilizer



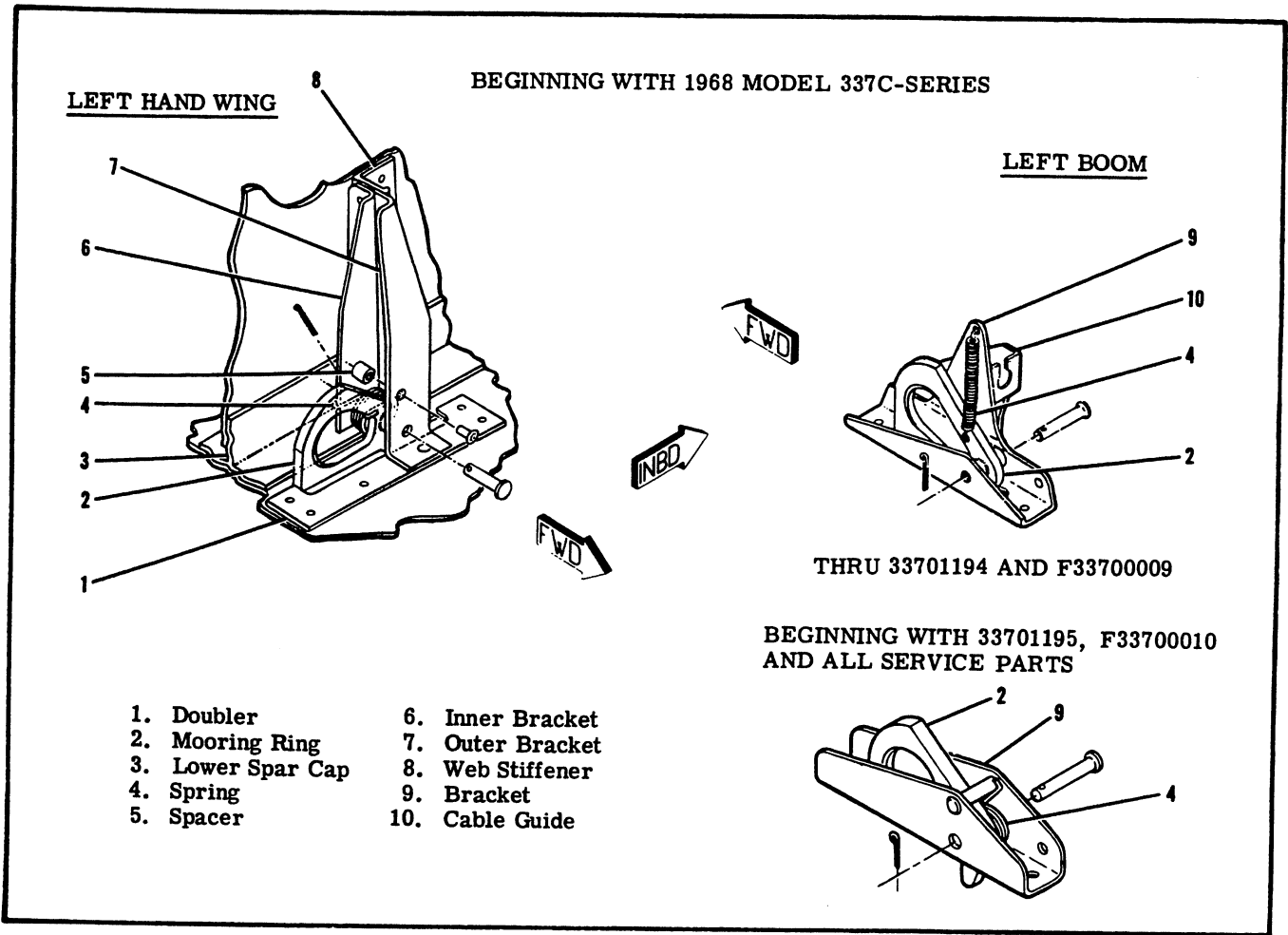


Figure 4-6. Retractable Mooring Rings

**SHOP NOTES:**

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