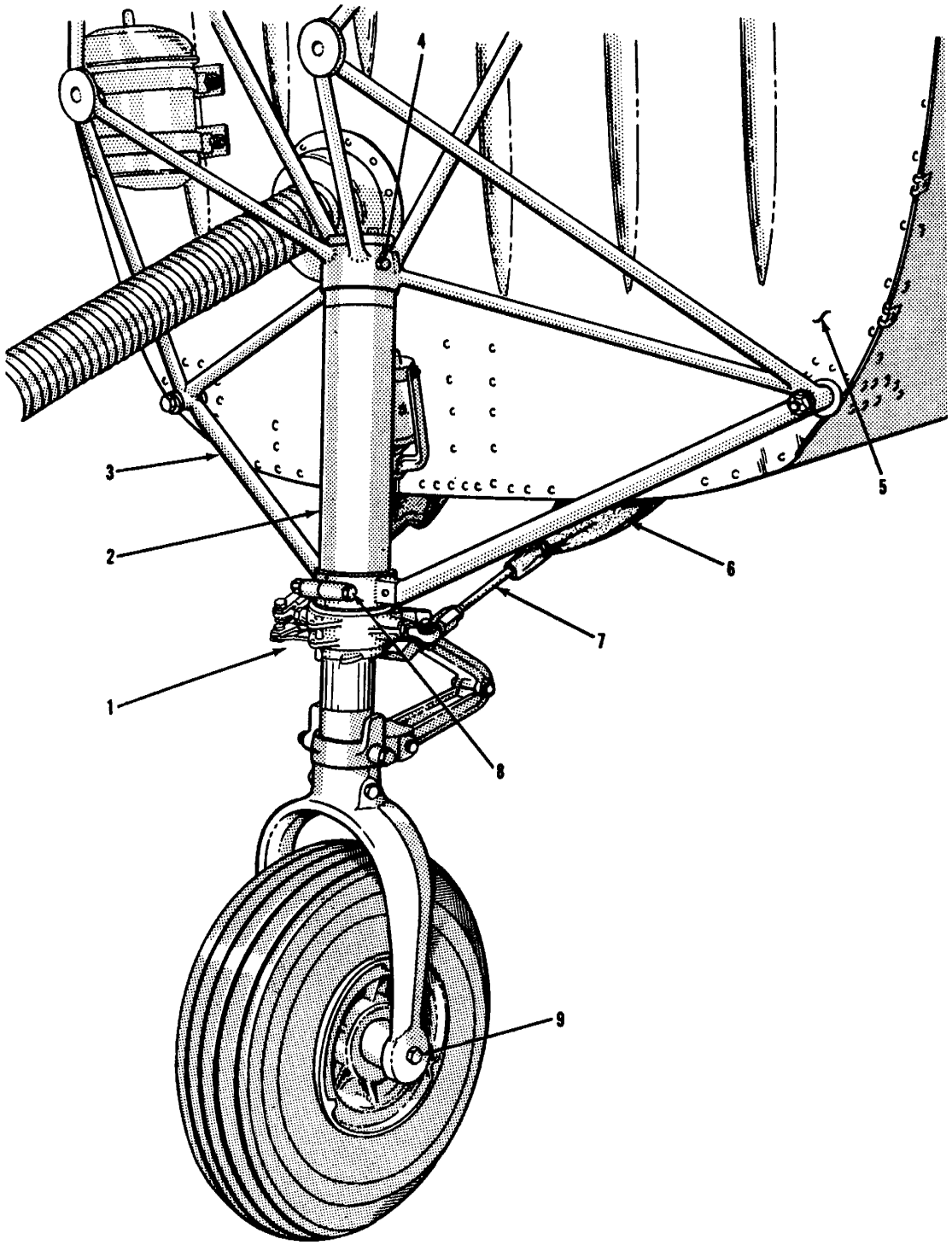
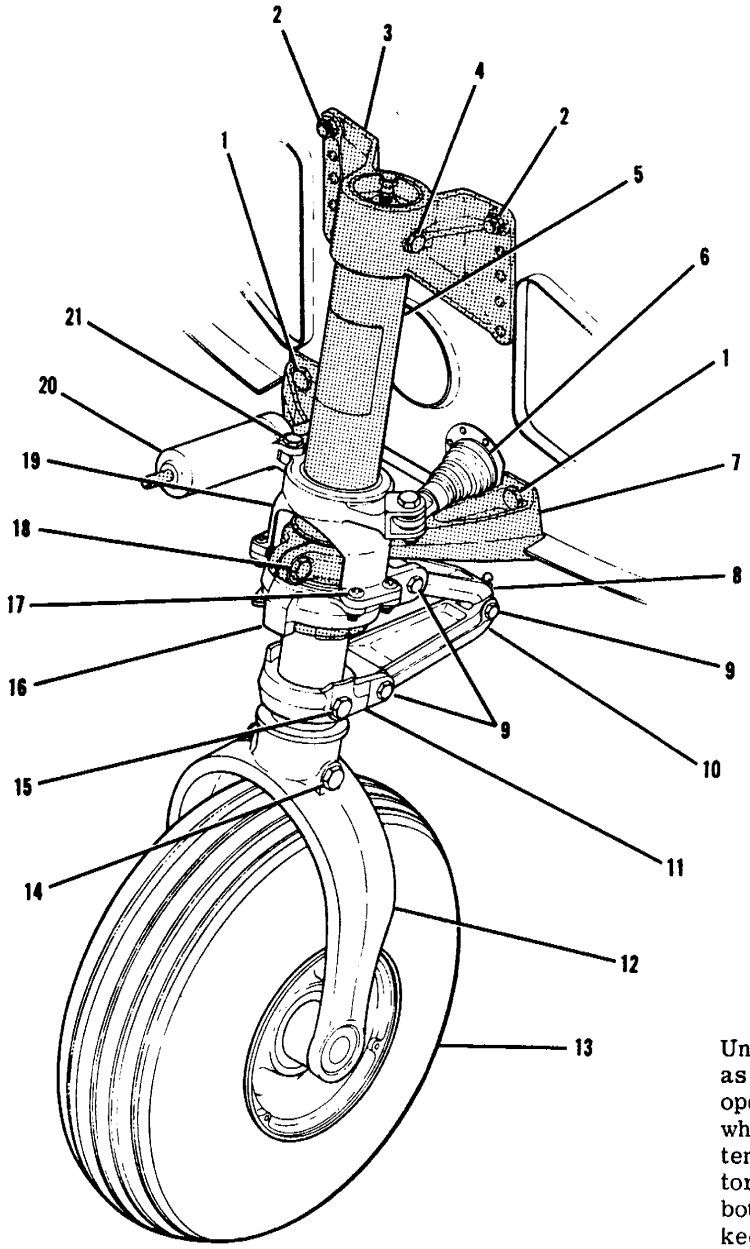


1. Shimmy Dampener Arm
2. Nose Gear Shock Strut
3. Engine Mount
4. Roll Pin
5. Firewall
6. Steering Tube Boot
7. Steering Tube
8. Bolt
9. Axle Bolt

Figure 5-12. Nose Gear — Model 150



NOTE

Unshaded parts of the nose gear turn as the nose gear steering system is operated on the ground, but do not turn while airborne. As the lower strut extends, a centering block on the upper torque link contacts a flat spot on the bottom end of the upper strut, thus keeping the lower strut and wheel from turning.

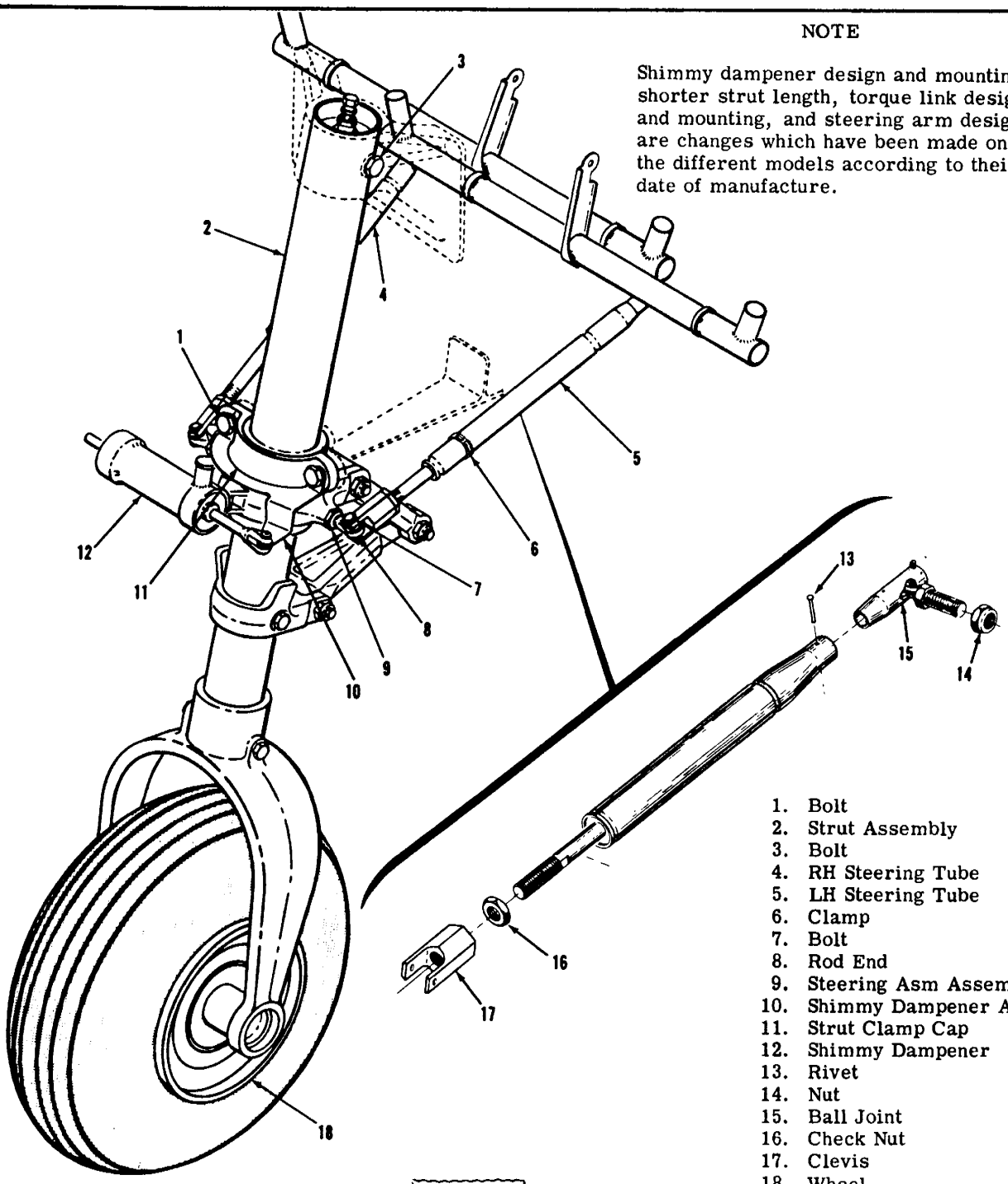
1. Bolt
2. Nut
3. Upper Forging
4. Bolt
5. Upper Strut
6. Steering Bungee
7. Lower Forging
8. Upper Torque Link
9. Bolt
10. Lower Torque Link
11. Torque Link Fitting
12. Nose Gear Fork
13. Wheel and Tire
14. Bolt
15. Bolt
16. Steering Collar
17. Screw
18. Bolt
19. Steering Torque Arm
20. Shimmy Dampener
21. Bolt

Figure 5-13A. Nose Gear (Model 182, 1962 & on)

SHOP NOTES:

NOTE

Shimmy dampener design and mounting, shorter strut length, torque link design and mounting, and steering arm design are changes which have been made on the different models according to their date of manufacture.



1. Bolt
2. Strut Assembly
3. Bolt
4. RH Steering Tube
5. LH Steering Tube
6. Clamp
7. Bolt
8. Rod End
9. Steering Asm Assembly
10. Shimmy Dampener Arm
11. Strut Clamp Cap
12. Shimmy Dampener
13. Rivet
14. Nut
15. Ball Joint
16. Check Nut
17. Clevis
18. Wheel

CAUTION

When installing cap (11), check the gap between the cap and the strut fitting before the attaching bolts are tightened. Gap tolerance is .010" minimum and .016" maximum. If gap exceeds maximum tolerance, install shims, Part No. 0543042-1 (.016") and Part No. 0543042-2 (.032"), as required to obtain gap tolerance. Replace the cap if gap is less than minimum, again using the shims to obtain proper gap. Install shims as equally as possible between sides.

Figure 5-13. Typical Nose Gear - Except Model 182(1962 & on) and Model 150

3. Pull the strut assembly down, out of the upper forging to remove.

g. To install the nose gear, reverse the above procedure. Always tighten the upper attachment before clamping the strut in the lower support to prevent misalignment.

5-32. DISASSEMBLY OF NOSE GEAR STRUT. Various changes have been made in the design of nose gear struts used on the different models, although the same general configuration is used. This paragraph outlines complete disassembly of the nose gear strut. In many cases, separating the upper and lower struts will permit inspection and parts replacement without complete strut disassembly. One major change (the elimination of the torque link fitting on some struts) requires a different disassembly procedure.

NOTE

The following procedure applies to nose struts with torque link fittings, illustrated in figure 5-14.

WARNING

Be sure strut is deflated completely before disconnecting torque links or removing bolt (24) securing metering pin base plug inside the strut.

a. Disconnect lower torque link from torque link fitting (23) by removing attaching bolt. Note position of any washers and spacers. Remove shimmy dampener.

NOTE

On the 182 (1962 and on), remove steering torque arm and lower forging (19 and 7, figure 5-13A) if these parts were not previously removed.

b. Remove lock ring (21) from groove inside lower end of upper strut (7). A small hole is provided at the lock ring groove to facilitate removal of the lock ring.

c. Use a straight, sharp pull to separate the upper and lower struts.

d. Remove lock ring (4) and bearing (5) from lower strut.

e. Slide packing support ring (13), scraper ring (14), retaining ring (15), and lock ring (21) from lower strut, noting the top side of each part to aid in assembly later.

NOTE

On some airplanes, the extend stop is a spacer located above packing support ring (13). Remove this spacer before removing the packing support ring.

f. Remove bolt (24) and slide torque link fitting (23) up, off lower strut. Some airplanes have spacers on bolt (24) to provide for tow bar attachment.

NOTE

Bolt (24) also holds metering pin base plug (19) in place.

g. Pull base plug (19) and assembled parts out of lower strut. Disassemble O-rings and metering pin from base plug as required.

h. Pull upper support assembly out of upper strut. Remove screws (3) to disassemble orifice piston support tube from the assembly. On later struts, these parts are brazed together.

i. Remove retaining ring (8), then slide steering arm assembly (9) up, off upper strut. Remove washer (10) and teflon shims if present.

NOTE

The following procedure applies to nose struts without torque link fittings, illustrated in figure 5-15.

WARNING

Be sure strut is deflated completely before disconnecting torque links or removing bolt (26) securing metering pin base plug inside the strut.

j. Disconnect lower torque link from nose gear fork (25) by removing attaching bolt. Note position of any washers and spacers. Remove shimmy dampener.

k. Remove lock ring (21) from groove inside lower end of upper strut (7). A small hole is provided at the lock ring groove to facilitate removal of the lock ring.

l. Use a straight, sharp pull to separate the upper and lower struts.

m. Remove lock ring (4) and bearing (5) from lower strut.

n. Slide packing support ring (13), scraper ring (14), retaining ring (15), and lock ring (21) from lower strut, noting the top side of each part to aid in assembly later.

o. Remove bolt (26) and pull base plug (19) and assembled parts out of lower strut. Disassemble O-rings and metering pin from base plug as required.

p. Pull upper support assembly out of upper strut.

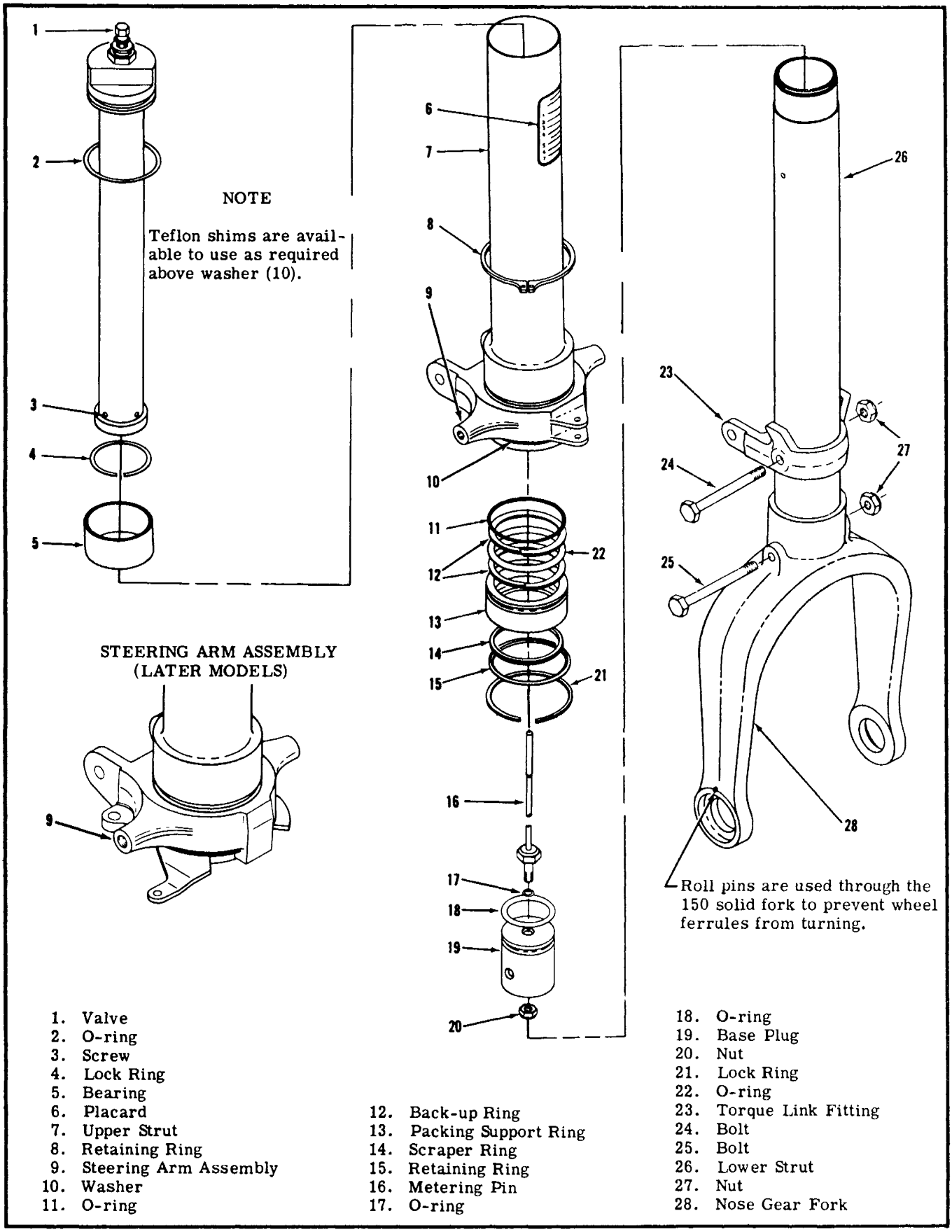
q. Remove retaining ring (8), then slide steering arm assembly (9) up, off upper strut. Remove washer (10) and teflon shims if present.

5-33. ASSEMBLY OF NOSE GEAR STRUT.

NOTE

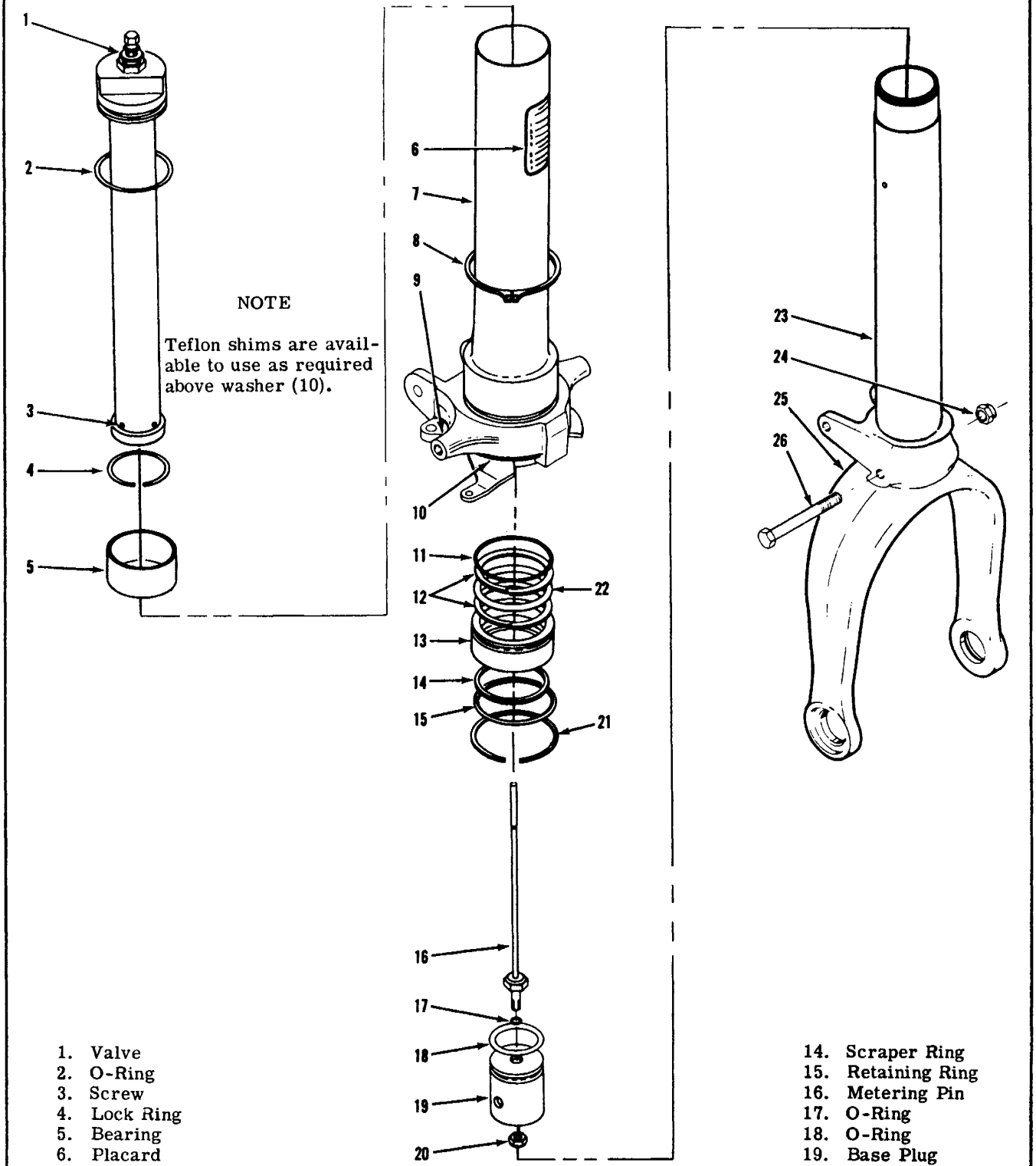
The following procedure applies to nose struts without torque link fittings, illustrated in figure 5-15.

a. Clean and check needle bearings in steering arm assembly (9) and pack with MIL-L-7711 grease. Slide washer (10), teflon shims (if required to eliminate excessive clearance), and the steering arm assembly down in position on strut (7) and secure with retaining ring (8). If the needle bearings are defective, the entire steering arm assembly should be re-



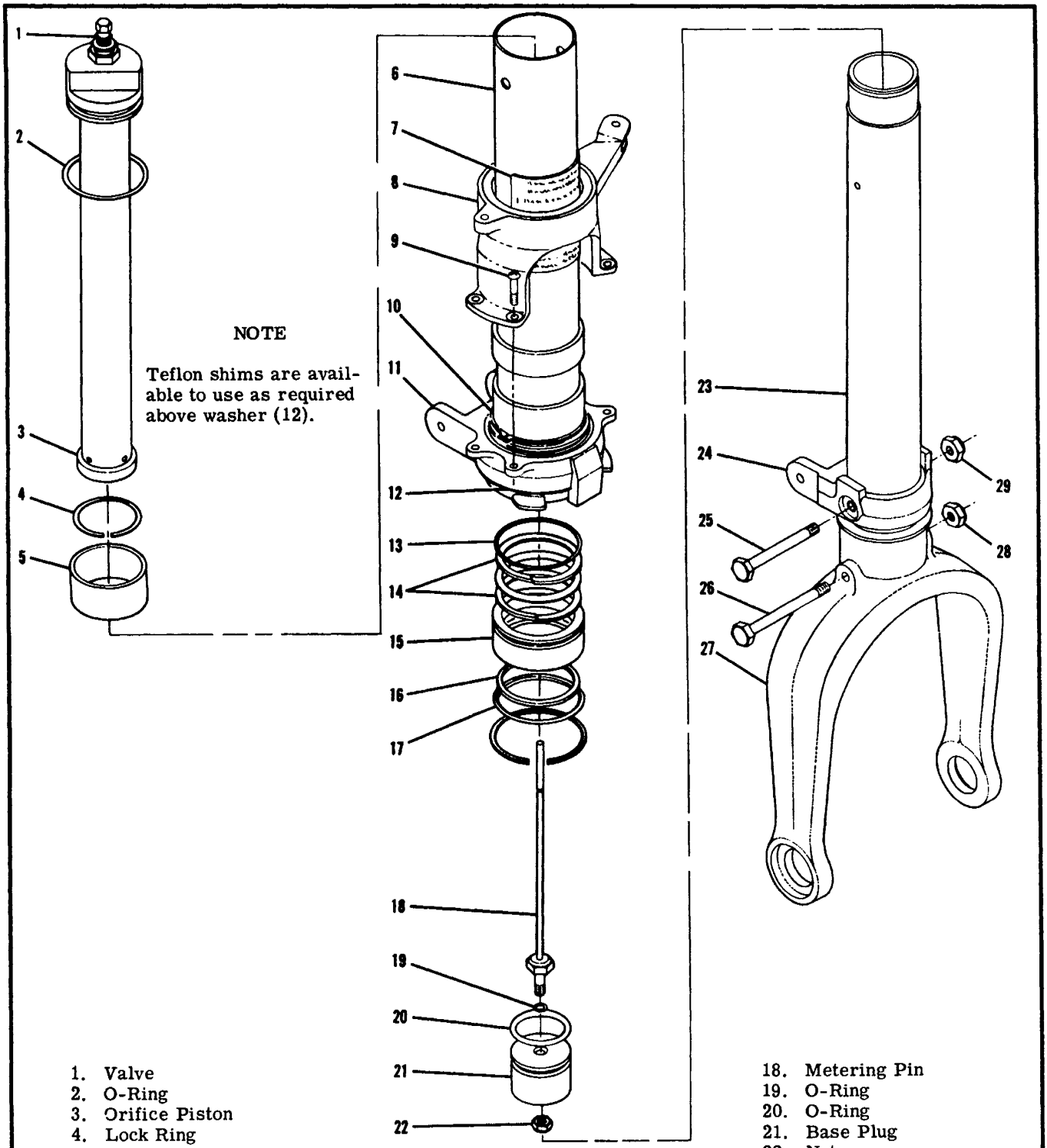
1. Valve
2. O-ring
3. Screw
4. Lock Ring
5. Bearing
6. Placard
7. Upper Strut
8. Retaining Ring
9. Steering Arm Assembly
10. Washer
11. O-ring
12. Back-up Ring
13. Packing Support Ring
14. Scraper Ring
15. Retaining Ring
16. Metering Pin
17. O-ring
18. O-ring
19. Base Plug
20. Nut
21. Lock Ring
22. O-ring
23. Torque Link Fitting
24. Bolt
25. Bolt
26. Lower Strut
27. Nut
28. Nose Gear Fork

Figure 5-14. Nose Gear Strut with Torque Link Fitting (Except 182, 1962 & on)



1. Valve
2. O-Ring
3. Screw
4. Lock Ring
5. Bearing
6. Placard
7. Upper Strut
8. Retaining Ring
9. Steering Arm Assembly
10. Washer
11. O-Ring
12. Back-up Ring
13. Packing Support Ring
14. Scraper Ring
15. Retaining Ring
16. Metering Pin
17. O-Ring
18. O-Ring
19. Base Plug
20. Nut
21. Lock Ring
22. O-Ring
23. Lower Strut
24. Nut
25. Nose Gear Fork
26. Bolt

Figure 5-15. Nose Gear Strut without Torque Link Fitting



1. Valve
2. O-Ring
3. Orifice Piston
4. Lock Ring
5. Bearing
6. Upper Strut
7. Placard
8. Steering Torque Arm
9. Screw
10. Retaining Ring
11. Steering Collar
12. Washer
13. O-Ring
14. Back-up Ring
15. Packing Support Ring
16. Scraper Ring
17. Retaining Ring
18. Metering Pin
19. O-Ring
20. O-Ring
21. Base Plug
22. Nut
23. Lower Strut
24. Torque Link Fitting
25. Bolt
26. Bolt
27. Nose Gear Fork
28. Nut
29. Nut

Figure 5-15A. Nose Gear Strut (Model 182, 1962 & on)

placed.

b. Install a new O-ring (2) on the upper support assembly and insert the assembly into upper strut (7). Align mounting holes and temporarily install a 5/16 bolt or pin to hold the support in position until the strut is installed in the airplane.

c. Using new O-rings, assemble metering pin (16) and base plug (19), then slide the assembly inside lower strut (23), align holes, and install bolt (26). Be sure to install the tow-bar spacers and nose wheel speed fairing or speed fairing plate, if used.

d. Slide lock ring (21), retaining ring (15), and scraper ring (14) in position on lower strut (23).

e. Assemble packing support ring (13) by installing O-ring (22) with one back-up ring (12) on each side of the O-ring. These are installed in the groove inside the packing support ring. Install O-ring (11) on the outside of the packing support ring and slide the assembled packing support ring in position on the lower strut.

f. Install bearing (5) and lock ring (4) on the top of lower strut (23).

g. Dampen all strut parts with plenty of clean hydraulic fluid to serve as a lubricant and slide lower strut into upper strut, using care not to damage seals. Slide all loose parts up inside the upper strut and secure with lock ring (21). Install the lock ring so one of its ends covers the small access hole, to make removal of the lock ring easier.

h. Install torque links and shimmy dampener. Where a speed fairing with a removable plate is used, the bolt attaching the torque link, or the one attaching the fork, also secures the removable plate.

i. Service shock strut after installation.

NOTE

The following procedure applies to nose struts with torque link fittings, illustrated in figure 5-14.

j. Clean and check needle bearings in steering arm assembly (9) and pack with MIL-L-7711 grease. Slide washer (10), teflon shims (if required to eliminate excessive clearance), and the steering arm assembly down in position on strut (7) and secure with retaining ring (8). If the needle bearings are defective, the entire steering arm assembly should be replaced. The 182 (1962 and on) has two needle bearings in this area, one in steering collar (11, figure 5-15A) and one in steering torque arm (8, figure 5-15A). On this airplane, the lower strut-to-fuselage forging must be in place before the steering torque arm is installed. If the lower forging was left on the fuselage, the steering torque arm must be positioned on the strut after the strut is inserted through the lower forging and before it is inserted into the upper forging.

k. Assemble orifice piston to the support tube with screws (3). On later struts, these parts are brazed together.

l. Install a new O-ring (2) on the upper support assembly and insert the assembly into upper strut (7). Align mounting holes and temporarily install a 5/16 bolt or pin (3/8 on later Model 150 struts) to hold the support in position until the strut is installed on the airplane.

m. Using new O-rings, assemble metering pin (16) and base plug (19), then slide the assembly inside lower strut (26). Slide torque link fitting (23) in position. Align mounting holes in the torque link fitting, lower strut, and base plug (19), then install bolt (24).

NOTE

If the early nose wheel speed fairing which is attached with bolt (24) is used, it must be positioned before installing torque link fitting (23). Likewise, install any tow-bar spacers that were removed.

n. Slide lock-ring (21), retaining ring (15), and scraper ring (14) in position on lower strut (26).

o. Assemble packing support ring (13) by installing O-ring (22) with one back-up ring (12) on each side of the O-ring. These are installed in the groove inside the packing support ring. Install O-ring (11) on the outside of the packing support ring and slide the assembled packing support ring in position on the lower strut. On those struts using an extend stop spacer, slide it in position next.

p. Install bearing (5) and lock ring (4) on the top of lower strut (26).

q. Dampen all strut parts with plenty of clean hydraulic fluid to serve as a lubricant and slide lower strut into upper strut, using care not to damage seals. Slide all loose parts up inside the upper strut and secure with lock ring (21). Install the lock ring so one of its ends covers the small access hole, to make removal of the lock ring easier.

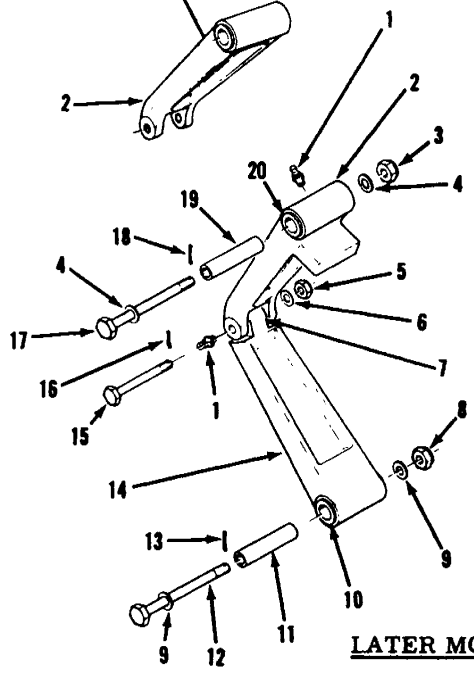
r. Install torque links and shimmy dampener. Where a speed fairing with a removable plate is used, the bolt attaching the torque link, or the one attaching the fork, also secures the removable plate.

s. Service shock strut after installation.

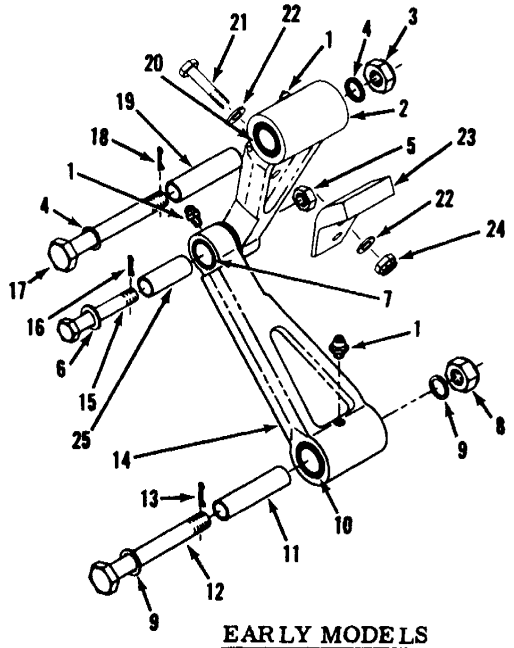
NOTE

Packing support rings with different width inner grooves and various seals have been used in the strut. On packing support rings with the wide groove, install a contoured rubber back-up ring above and below the O-ring. If strut is equipped with a packing support ring having the narrow groove, install one contoured rubber back-up ring below the O-ring. If any struts are found with Teflon or leather back-up rings installed in the packing support ring inner groove, replace with the contoured back-up rings above and below the O-ring.

USED ON MODEL 182
1958 THRU 1961



LATER MODELS

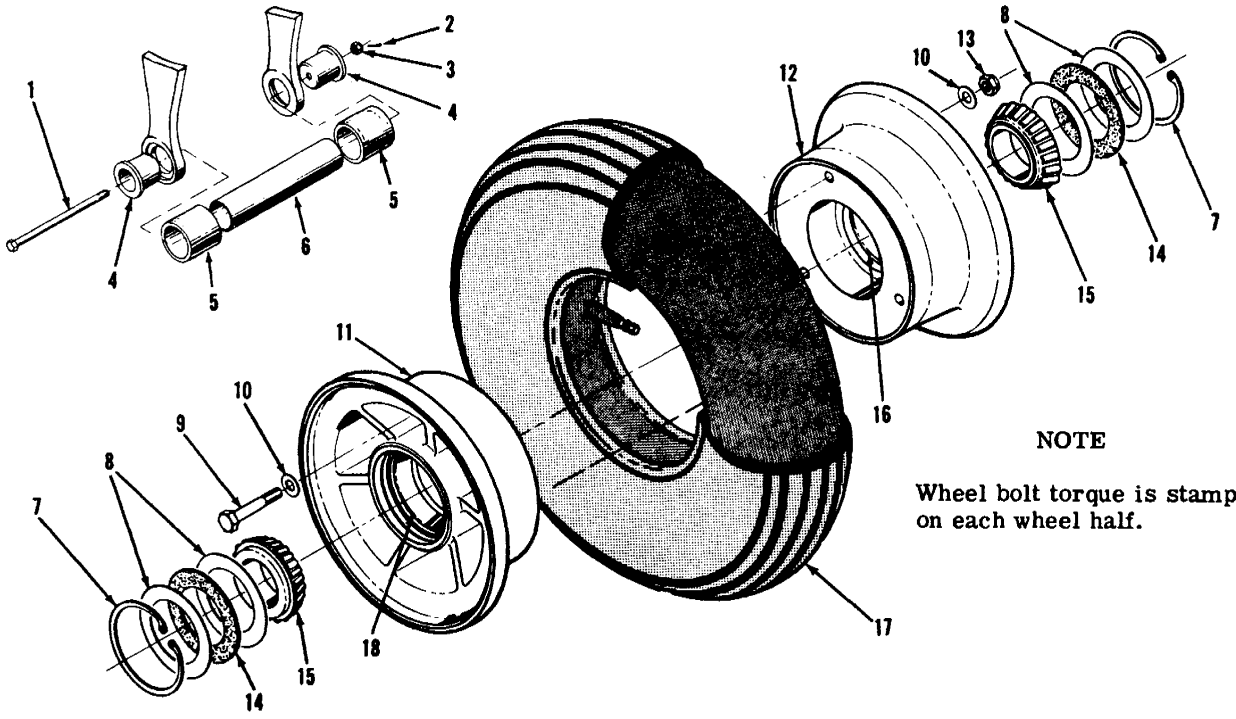


EARLY MODELS

1. Grease Fitting
2. Upper Torque Link
3. Nut
4. Washer
5. Nut
6. Washer
7. Bushing
8. Nut
9. Washer
10. Bushing
11. Spacer
12. Bolt
13. Cotter Pin
14. Lower Torque Link
15. Bolt
16. Cotter Pin
17. Bolt
18. Cotter Pin
19. Spacer
20. Bushing
21. Bolt
22. Washer
23. Extend Stop
24. Nut
25. Spacer

Figure 5-16. Torque Links

SHOP NOTES:



NOTE

Wheel bolt torque is stamped on each wheel half.

1. Bolt
2. Cotter Pin
3. Nut
4. Axle Bolt Bucket
5. Axle Spacer
6. Axle Tube
7. Retaining Ring
8. Ring
9. Bolt
10. Washer
11. Wheel Half
12. Wheel Half
13. Nut
14. Felt Seal
15. Bearing Cone
16. Bearing Cup
17. Tire
18. Bearing Cup

Figure 5-17. Goodyear Nose Wheel (Tube Type Tire)

5-34. NOSE WHEEL.

5-35. Goodyear or Cleveland 5.00 x 5 nose wheels may be used interchangeably on all Cessna single-engine aircraft. Although tubeless tires have been used on production aircraft since 1959, nose wheels may be modified to use tires and tubes. Either a Goodyear or Cleveland, tubeless or tube-type wheel may be found on the nose gear.

5-36. REPLACEMENT. (See figure 5-17.)

a. Depress and tie down or weight the tail of the airplane to raise the nose wheel off the ground.

b. Remove the nose wheel axle bolt.

c. Use a rod or long punch inserted in bucket (4) or ferrule to tap the opposite bucket or ferrule out of the fork. Remove both buckets and pull the nose wheel from the fork.

NOTE

Buckets (4) are used on aircraft without speed fairings. With speed fairings the solid ferrules are used. On the Model 150, the ferrules need not be removed prior to wheel removal. When speed fairings are installed, the nose wheel speed fairing can be flexed far enough to permit removal of the ferrules; if need be, the scraper may be disconnected for more flexibility.

d. Remove spacers (5) and axle tube (6) before disassembling the nose wheel.

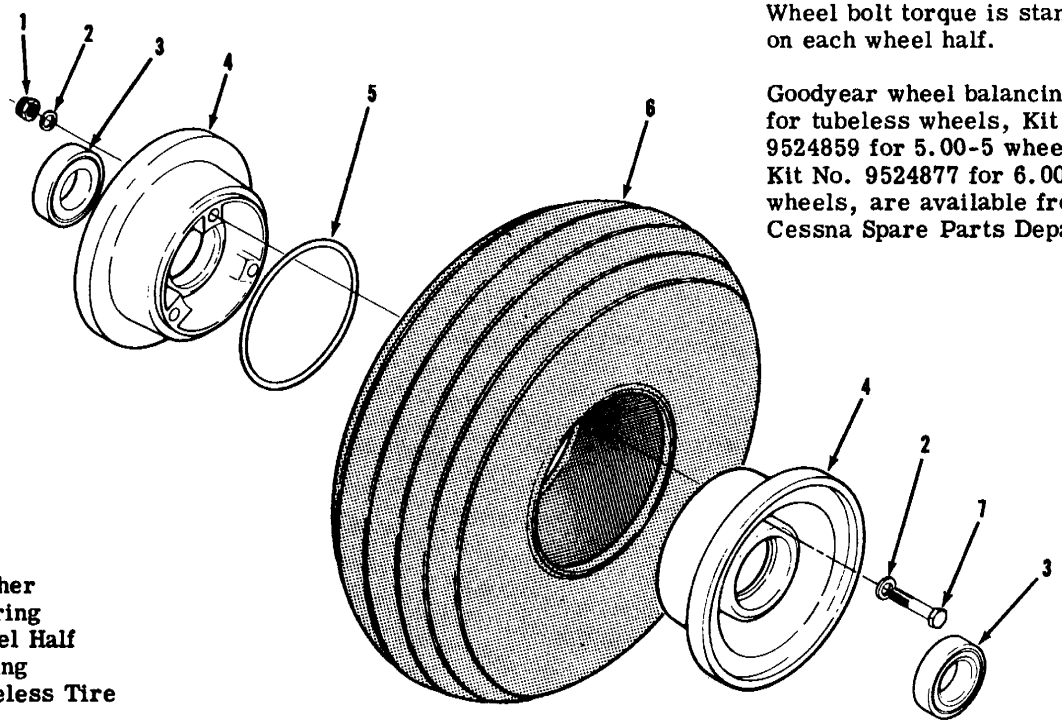
e. Reverse the preceding steps to install the nose wheel. Tighten the axle bolt until a slight bearing drag is obvious when the wheel is turned. Back off the nut to the nearest castellation and install the cotter pin. On the 150, position the ferrules so the slots in the ferrules engage the roll pins in the fork.

NOTE

If a different tire was installed or the speed fairing scraper adjustment disturbed, set the scraper clearance at .19 to .31 inch.

5-37. DISASSEMBLY.

a. Completely deflate the tire. Remove valve core in tube-type tires; insert filler needle in tubeless tires to release pressure. Break tire beads loose.



Note

Wheel bolt torque is stamped on each wheel half.

Goodyear wheel balancing kits for tubeless wheels, Kit No. 9524859 for 5.00-5 wheels and Kit No. 9524877 for 6.00-6 wheels, are available from the Cessna Spare Parts Department.

1. Nut
2. Washer
3. Bearing
4. Wheel Half
5. O-ring
6. Tubeless Tire
7. Bolt

Figure 5-18. Goodyear Nose Wheel (Tubeless Tire)

WARNING

Injury can result from attempting to separate wheel halves with tire inflated. Avoid damaging wheel flanges when breaking tire beads loose.

b. Remove thru-bolts and separate wheel halves.
c. Remove tire and tube. With tubeless tires, remove O-ring placed between wheel halves to seal them against leakage.
d. Remove bearing retaining rings, grease seals, and bearing cones. Various types have been used according to the model and date of manufacture.

NOTE

The bearing cups are a press fit in the wheel halves and should not be removed unless replacement is necessary. To remove, heat the wheel half in boiling water for 15 minutes. Using an arbor press, if available, press out the bearing cup and press in the new one while the wheel is still hot.

5-38. INSPECTION AND REPAIR. Instructions given in paragraph 5-14 for the main wheels may be used as a guide for inspection and repair of the nose wheels.

5-39. ASSEMBLY.
a. On tube-type tires, insert tube in tire, aligning yellow stripe on tube with red dot on tire. Place tire on wheel half and position valve stem through valve hole. Insert thru-bolts, position other wheel half, and secure with nuts and washers. Take care to avoid pinching tube between wheel halves. Torque to value marked on wheel.
b. On tubeless tires, insert thru-bolts through one wheel half and place tire in position. Inspect the O-ring groove on both wheel halves to assure a smooth, clean surface. Dirt or chips under the O-ring will cause an air leak. Wipe the O-ring with clean bearing grease and center in the O-ring groove. Place the other wheel half in position. Apply a light force to bring the wheel halves together; if the wheel halves do not bottom solidly together, the O-ring is not placed properly. Maintaining the light force, assemble a washer and nut on one thru-bolt and tighten snugly. Assemble the remaining nuts and washers on the thru-bolts and torque to the value marked on the wheel.

CAUTION

Uneven or improper torque of the thru-bolt nuts may cause bolt failure with resultant wheel failure.

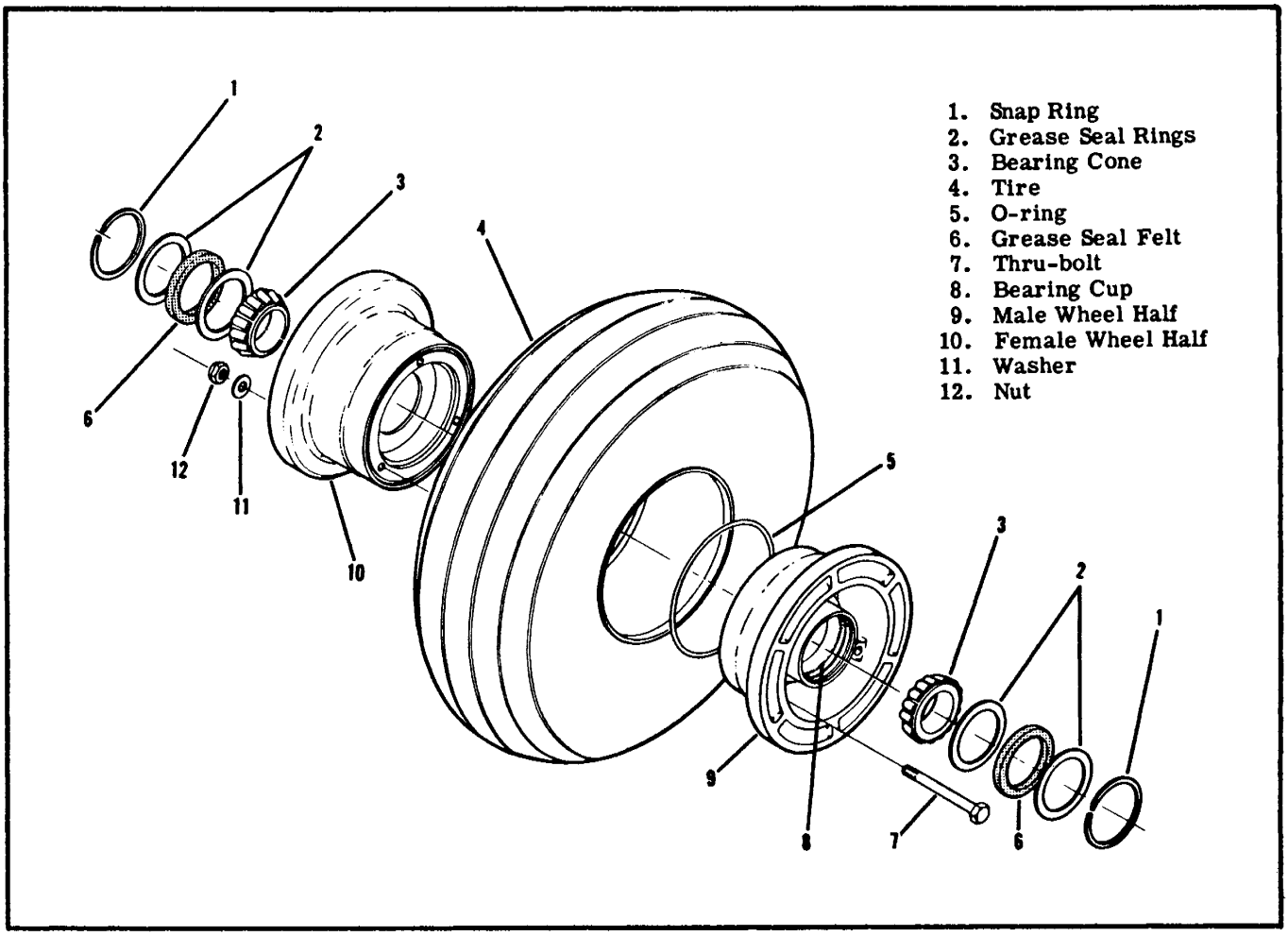


Figure 5-19. Cleveland Nose Wheel

c. Clean and repack bearing cones with clean wheel bearing grease.
d. Assemble bearing cones, seals, and retainers into the wheel half.

NOTE

Various bearings, seals, and retainers have been used among the different models, according to their date of manufacture.

e. Inflate tire to seat tire beads, then adjust to correct pressure.

NOTE

A tire expander to facilitate tubeless tire installation is available from the Cessna Spare Parts Department.

5-40. INFLATING AND BALANCING THE NOSE WHEEL.

NOTE

The following information applies to Goodyear tube-type wheel assemblies. Balancing kits for Goodyear tubeless wheel assemblies, Kit No. 9524859 for 5.00 - 5 wheels and Kit No. 9524877 for 6.00 - 6 wheels, are available from the Cessna Spare Parts Department.

Nose wheel components are balanced by the manufacturer and marked with a yellow stripe on the tube which should be aligned with a red dot on the tire sidewall. Where a better balance is required, small balance weights may be added to the wheel flange. Balance the nose wheel as follows:
a. Remove any flange balance weights before mounting a new tire.
b. Install inner tube in tire with yellow stripe on tube aligned with red dot on tire.
c. Assemble wheel halves over tire and tube and torque thru-bolts to value marked on wheel.
d. Inflate to seat tire beads, then adjust to correct pressure.

NOTE

The wheel should now be within the manufacturer's balancing tolerance; to achieve a better balance, proceed with the following steps.

e. Check the inflated nose wheel for balance and correct minor unbalance by deflating and rotating

the tire. Avoid damaging the valve stem or inner tube when rotating the tire.

f. If wheel is still unbalanced:
   1. Check for light spot and mark.
   2. Deflate tire and install the strap of the weight between the tire bead and the wheel flange at the marked location.
   3. Bend the weight strap around the flange so that the weight fits tightly against the flange.
   4. Reinflate tire to correct pressure.

NOTE

Goodyear supplies the following balance weights: 1/2 ounce balance weight, Part No. 9523948; 1 ounce balance weight, Part No. 9523947.

NOTE

Goodyear, in the manufacture of the nose wheel, puts a valve hole opening in both wheel halves to make them interchangeable. However, under certain conditions, dust can enter through the opening in the wheel half not using the valve stem and settle on the axle and bearings, causing rapid wear. Goodyear has a caplug, which is to be inserted in the open hole, and a rubber grommet or tubing to fit over the valve stem. These two items seal the wheel halves and prevent foreign material from entering.

SHOP NOTES:

5-41. NOSE WHEEL STEERING SYSTEM.

5-42. Nose wheel steering is accomplished through use of the rudder pedals. On all models except the 182 (1962 and on), two spring-loaded push-pull tubes connect the rudder bars to the nose gear. On the 182 (1962 and on), a steering bungee links the nose gear to a bellcrank which is operated by push-pull rods connected to the rudder bars. Steering is afforded up to approximately 10° each side of neutral, after which brakes may be used to gain a maximum deflection of 30° right or left of center. Flexible boots seal the fuselage entrance of the steering tubes or bungee. A sprocket-operated screw mechanism to provide rudder trim on the 182 (1962 and on) is incorporated at the aft end of the bungee. The trim system is discussed in Section 10.

5-43. STEERING TUBE AND BUNGEE ASSEMBLIES are spring-loaded and should not be disassembled internally. The steering tubes are connected by clevises to rod ends extending from the steering arm assembly on the nose gear and by a ball joint connection at the rudder pedal crossbars. The steering bungee is connected to the steering torque arm by a bearing end assembly and to the steering bellcrank by a rod end.

5-44. ADJUSTMENT OF NOSE WHEEL STEERING. Since the nose wheel steering system, rudder system, and rudder trim system are interconnected, adjustments to one system may affect the others. Section 10 contains rigging instructions for the nose wheel steering system as well as the rudder and rudder trim systems.