





## RECORD OF CONVERSATION

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**Central Regional Office**  
**Office of Aviation Safety**  
**National Transportation Safety Board**

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**Date: 11/03/2021**  
**Person Contacted: Jerard Haas (Airframe and Powerplant Mechanic/**  
**Inspection Authorization – Heinen Aviation Services)**  
**NTSB Case Number: CEN21LA448**

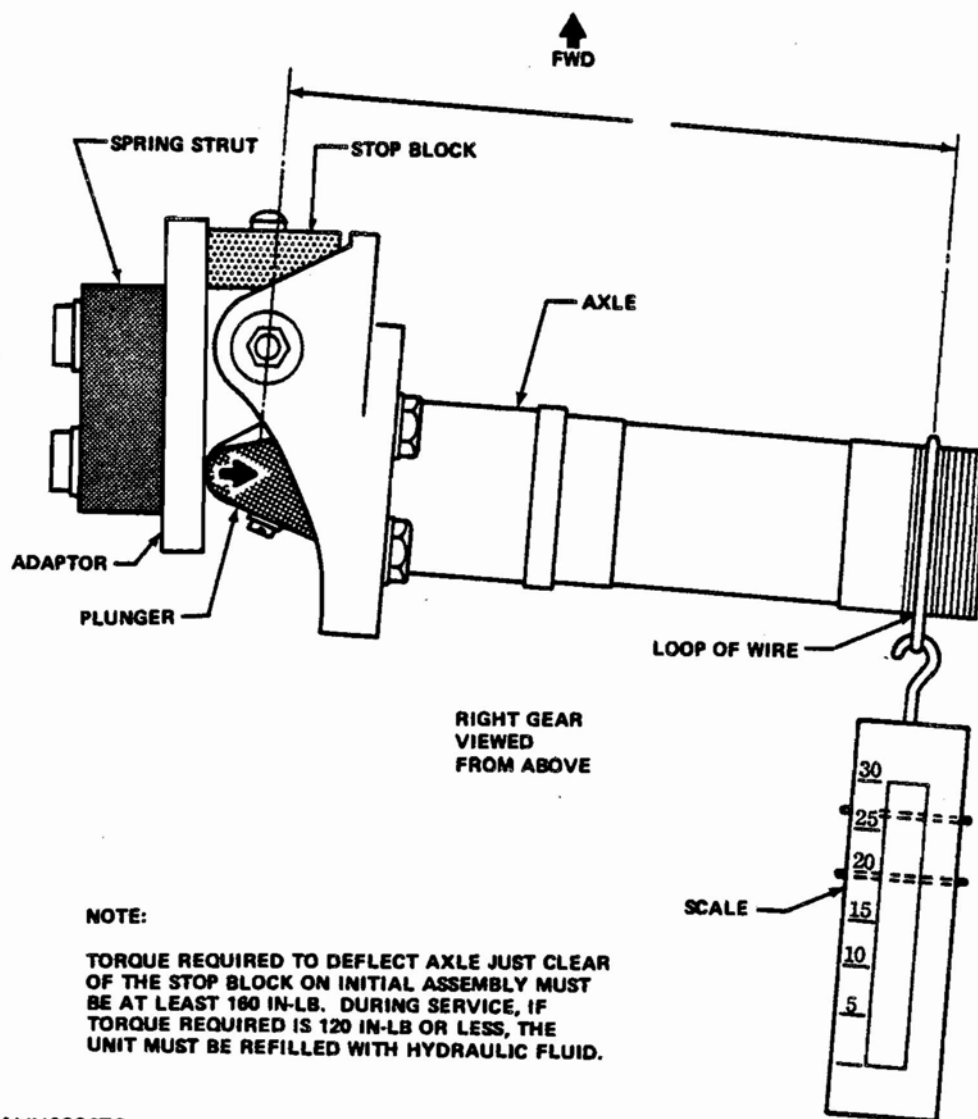
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### **Narrative:**

The following is a synopsis of the information provided by Jerard Haas to the NTSB investigator-in-charge, via a telephone conversation.

- Jerard examined N140R (Cessna 305A airplane) with two Federal Aviation Administration aviation safety inspectors (from the Wichita Flight Standards District Office) on October 19, 2021, in Topeka, Kansas. The two owners of the airplane were also present during the examination.
- The empennage of the airplane was elevated up and the tailwheel assembly was rotated in different directions by hand.
- When the tailwheel assembly was moved in one direction, it had tension. When the tailwheel assembly was moved in another direction, there appeared to be no tension. The tailwheel assembly exhibited an extreme amount of play when moved in the direction of no tension.
- The tailwheel assembly was not disassembled at the time; however, it is believed the tailwheel assembly internal locking mechanism likely failed for unknown reasons.

\*\*\*\* Nothing Follows \*\*\*\*



AVN000676

Figure 4-28. Axle torque measurement

leaf spring assembly. The tailwheel assembly is controlled through a rudder control system.

**4-335. TROUBLESHOOTING.** Troubleshooting consists of locating and correcting failure, binding, or unsatisfactory operation of the tail landing gear assembly. The following procedures list the most common troubles, probable causes, and possible remedies.

#### 4-336. TAILWHEEL ASSEMBLY.

**4-337.** The tailwheel assembly consists of a two-piece, cast magnesium alloy wheel and an 8 X 3.00-4, 4-ply tire and inner tube. The tailwheel assembly is equipped with tapered roller bearing cones and shrink-fit bearing cups.

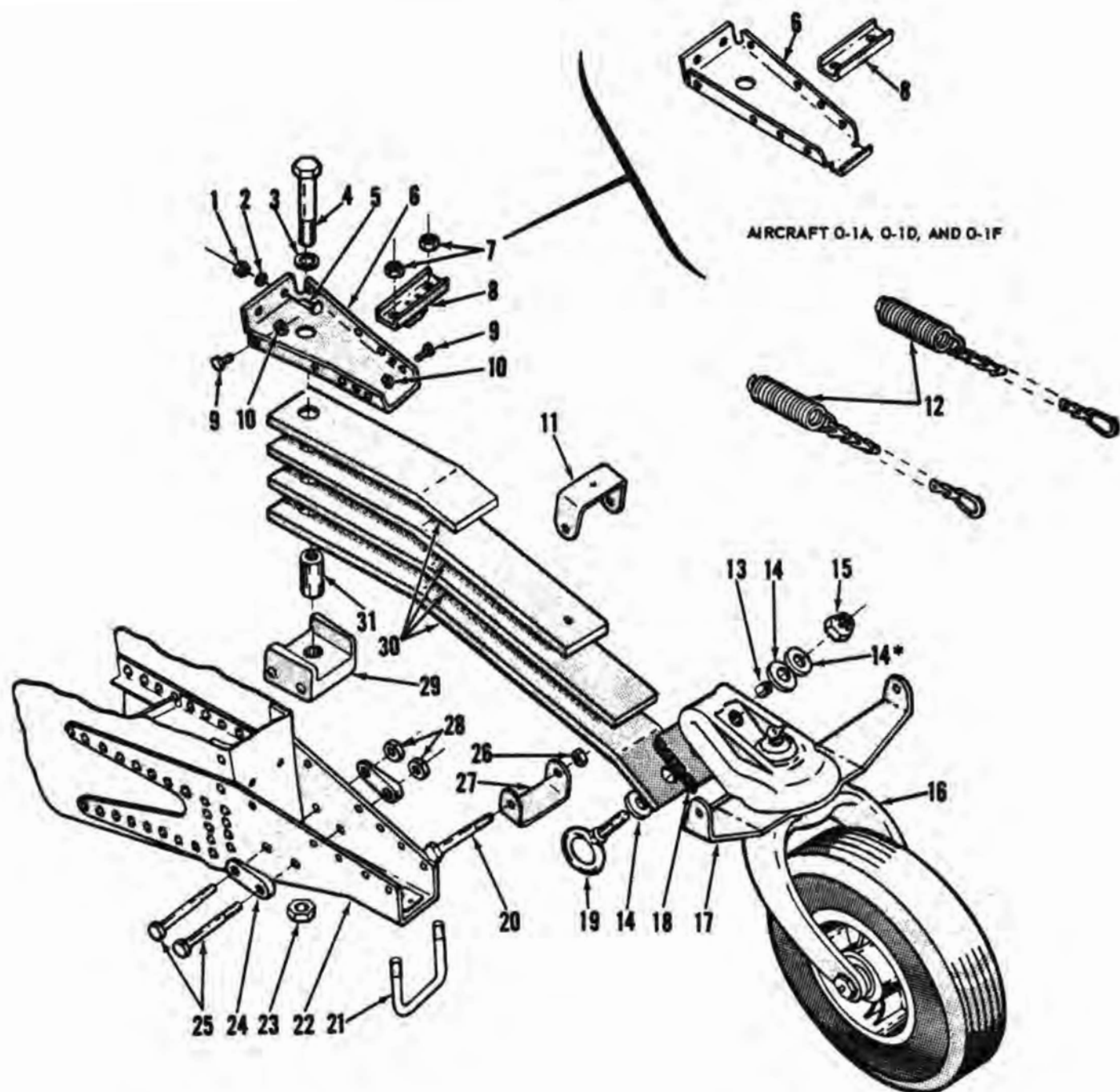
#### 4-338. REMOVAL.

a. Jack fuselage in accordance with instructions under JACKING, Chapter 1, Section III.

#### Warning

**Deflate tire completely before removing axle nut to prevent possible injury to maintenance personnel.**

b. Remove cotter pin (11, figure 4-30), axle (23), washers (13), and axle nut (12) securing tailwheel assembly to fork (25).



AIRCRAFT O-1D, O-1E, O-1F, AND O-1G

- |              |                              |                      |
|--------------|------------------------------|----------------------|
| 1. NUT       | 12. STEERING SPRING ASSEMBLY | 22. MOUNTING BRACKET |
| 2. WASHER    | 13. BUSHING                  | 23. NUT              |
| 3. WASHER    | 14. WASHER                   | 24. SPACER           |
| 4. BOLT      | 15. NUT                      | 25. BOLT             |
| 5. BOLT      | 16. WHEEL AND FORK ASSEMBLY  | 26. NUT              |
| 6. CHANNEL   | 17. STEERING ARM             | 27. STEERING GUARD   |
| 7. NUT       | 18. SPACER                   | 28. NUT              |
| 8. STIFFENER | 19. EYEBOLT                  | 29. BLOCK            |
| 9. BOLT      | 20. BOLT                     | 30. LEAF SPRING      |
| 10. NUT      | 21. U-BOLT                   | 31. BUSHING          |
| 11. SHACKLE  |                              |                      |

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Figure 4-29. Tailwheel landing gear assembly (all aircraft not modified to 2800-pound gross weight configuration)

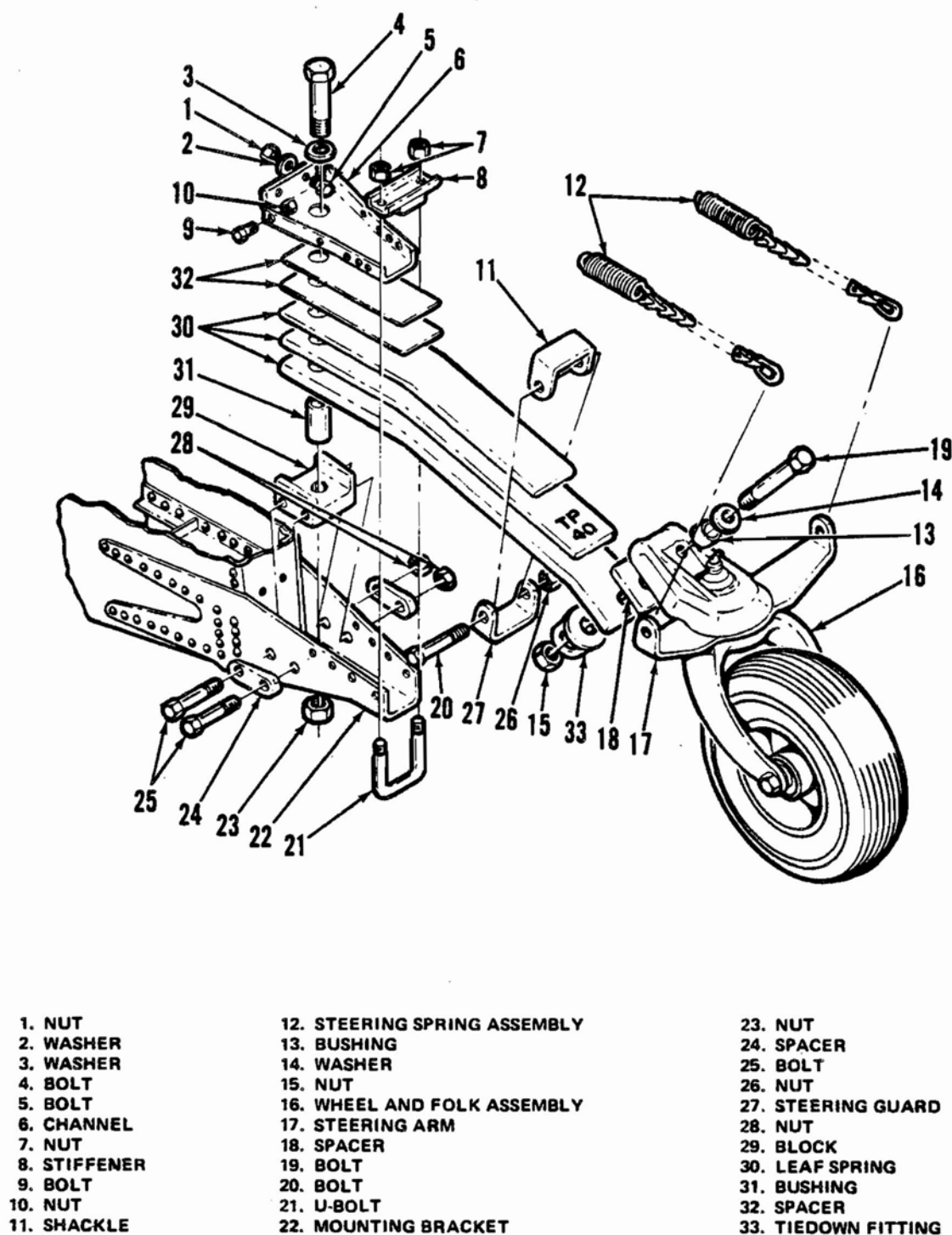


Figure 4-29A. Tailwheel landing gear assembly (all aircraft modified to 2800-pound gross weight configuration).

| INDICATION OF TROUBLE                               | PROBABLE CAUSE                  | CORRECTIVE ACTION                                                                                     |
|-----------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------|
| Tailwheel fails to respond to rudder pedal movement | Broken steering spring assembly | Replace defective steering spring assembly. (Refer to paragraphs 4-347 and 4-353.)                    |
| Tailwheel shimmies                                  | Loose fork nut                  | Tighten fork nut.                                                                                     |
|                                                     | Tailwheel tire out of round     | Replace Tire. (Refer to paragraph 4-336.)                                                             |
| Tail landing gear fails to absorb shock             | Broken spring leaf              | Replace broken spring leaf. (Refer to paragraph 4-354.)                                               |
|                                                     | Tailwheel tire overinflated     | Reduce air pressure to 35 psi (40 psi on aircraft modified to 2800-pound gross weight configuration). |
| Tailwheel fails to swivel                           | Bent steering arm               | Straighten or replace steering arm. (Refer to paragraphs 4-348 and 4-352.)                            |

#### 4-339. DISASSEMBLY.

a. Remove valve cap, depress valve to release pressure completely, and remove valve core.

b. Break tire from wheel halves in accordance with TM 55-405-3.

c. Remove nuts (6, figure 4-31) from bolts (12). Exercise care not to crack or twist bolts or strip threads.

d. Separate wheel halves (7 and 11) and remove bolts (12), gasket (10), tire (9), and inner tube (8).

e. Bearing cups (5) are a shrink-fit and may be removed from wheel halves (7 and 11) only if proper facilities are available. Remove bearings as follows:

(1) Remove spacers (1), grease retainers (2), spacers (3), and bearing cones (4) from wheel halves (7 and 11).

#### Caution

Never attempt to remove bearing cup before wheel half has been heated by immersion in boiling water for a minimum of 30 minutes.

(2) Heat wheel half by immersion in boiling water for a minimum of 30 minutes.

(3) Remove bearing cup with a hand arbor press or tap out with a brass or fiber drift pin and hammer.

4-340. CLEANING. Wash all metal parts with drycleaning solvent (item 4, table 1-6) and dry with compressed air.

#### 4-341. INSPECTION.

a. Inspect wheel halves, tire, and inner tube in accordance with TM 55-405-3.

b. Inspect metal parts for cracks, nicks or burrs, distortion, corrosion, and malformed threads.

c. Inspect bearing cones and cups for evidences of brinelling, corrosion, and nicks or burrs.

d. Inspect tailwheel attaching bolt for proper nut (MS21044N6).

#### 4-342. REPAIR OR REPLACEMENT.

#### Warning

Tires for the tail wheel shall be of straight sidewall construction to prevent binding at yoke. Balloon type or soft sidewall tires under P/N MS35389-102 shall not be installed.

a. Perform repair or replacement for wheel, tire, and inner tube in accordance with TM 55-405-3.

b. Repair of the tailwheel assembly consists of replacing unserviceable components with like serviceable components.

## 4-343. REASSEMBLY.

### Caution

Never attempt to install bearing cup in wheel half before bearing cup has been chilled on dry ice and wheel half has been heated by immersion in boiling water for a minimum of 30 minutes.

a. To install new bearing cups (5, figure 4-31) in wheel halves (7 and 11), immerse wheel halves in boiling water for 30 minutes, and simultaneously chill bearing cups on dry ice for a minimum of 30 minutes.

b. Seat chilled bearing cup on heated wheel half and press in with a suitable hand arbor press or tap in with a brass or fiber drift pin and hammer.

c. Pack bearing cones with grease (item 17, table 1-6), ensuring to work grease thoroughly inside and around bearing cone races and rollers. Apply a thin coat of grease on outside of bearing cones and inside race of bearing cups.

d. Insert bearing cones (4), spacers (3), grease retainers (2), and spacers (1) in wheel halves (7 and 11).

e. Entirely deflate tube and insert into tire. Fold tube to make this operation easier.

### Warning

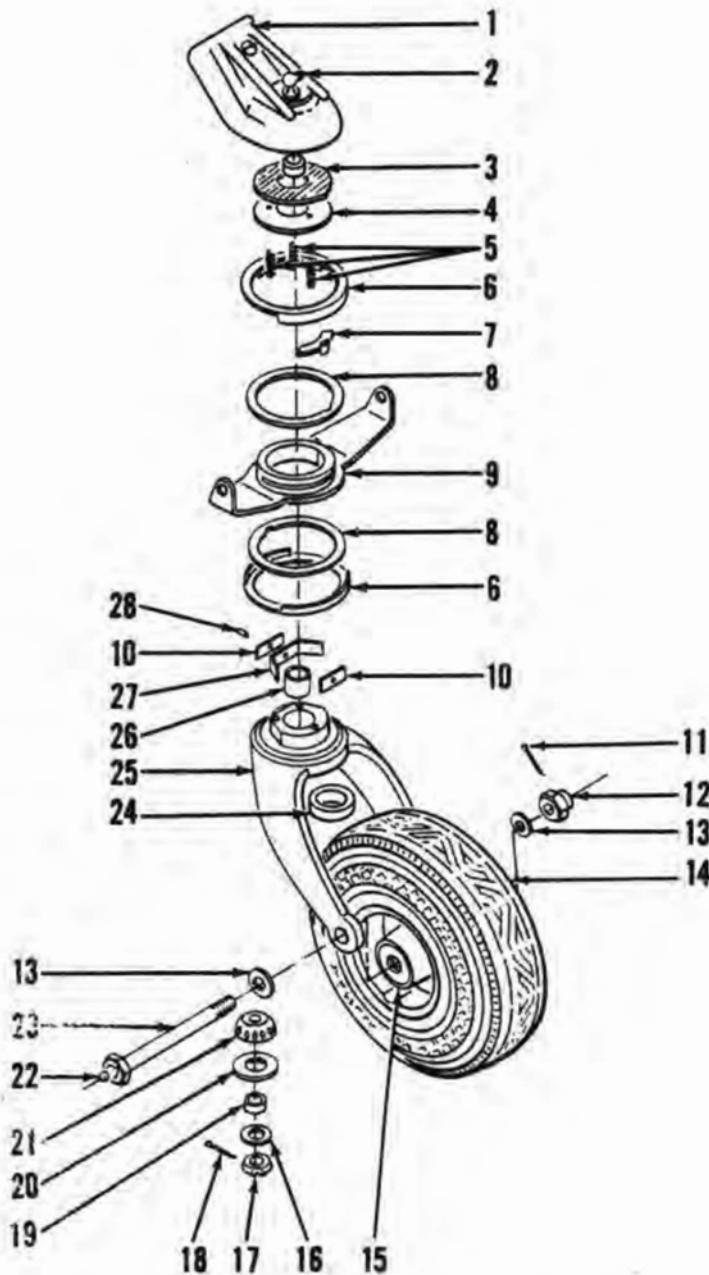
Tires for the tail wheel shall be of straight sidewall construction to prevent binding at yoke. Balloon type or soft sidewall tires under P/N MS35389-102 shall not be installed.

f. Install valve core and inflate until tube in rounded out, probing with fingers to remove trapped air.

g. Install left wheel half (11) in tire (9). Push air valve through left wheel half valve hole. Ensure that inner tube (8) does not extend past inner portion of left wheel half.

h. Position gasket (10) on left wheel half (11) and install right wheel half (7) in tire (9) with air valve extending from left wheel half.

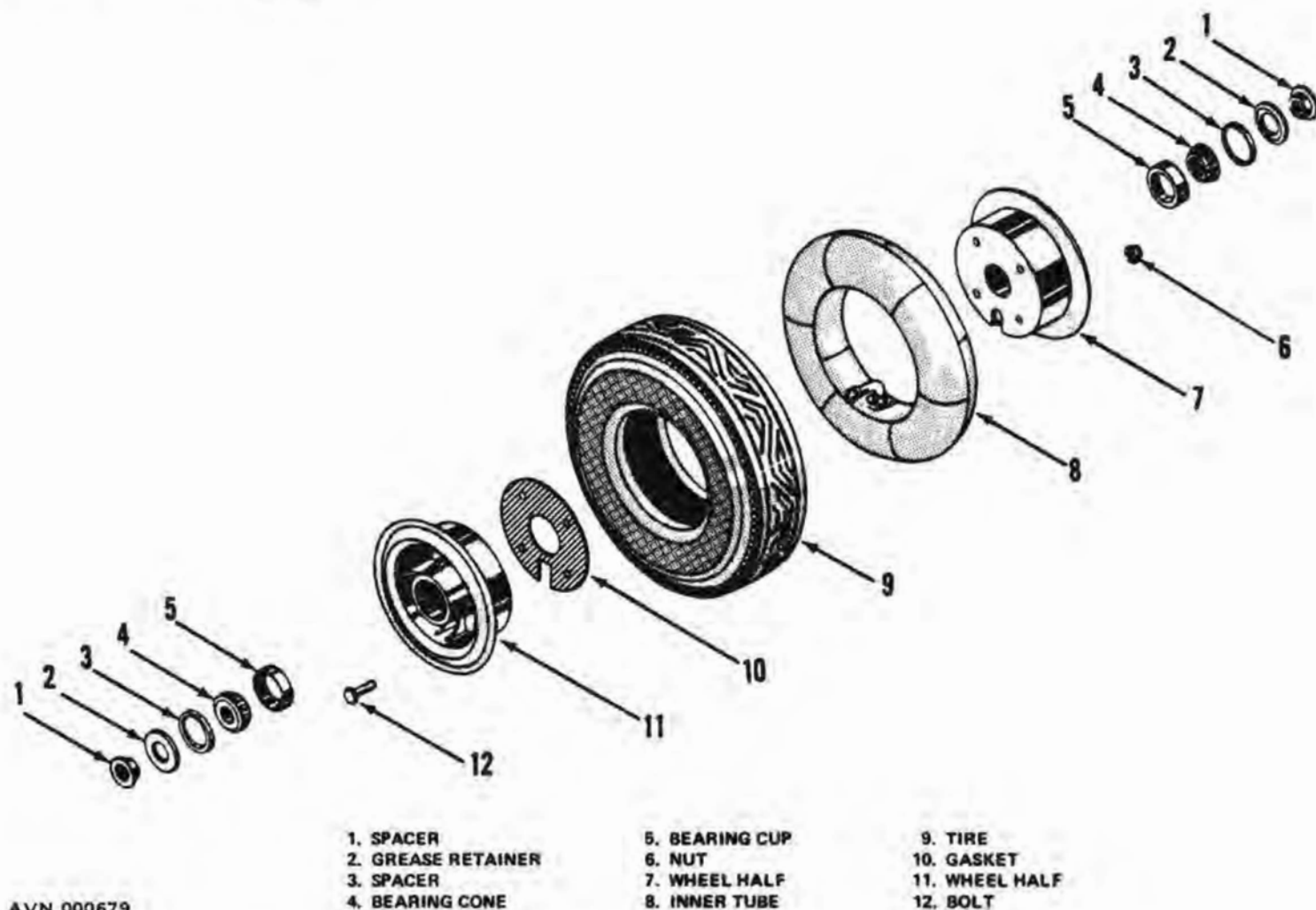
i. Insert bolts (12) through wheel halves (7 and 11) and install nuts (6). Tighten nuts securely.



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|------------------------|------------------------|
| 1. BRACKET             | 15. TAILWHEEL ASSEMBLY |
| 2. LUBRICATION FITTING | 16. WASHER             |
| 3. WASHER              | 17. FORK NUT           |
| 4. THRUST PLATE        | 18. COTTER PIN         |
| 5. SPRINGS             | 19. SPACER             |
| 6. DUST COVER          | 20. GREASE RETAINER    |
| 7. PAWL                | 21. BEARING CONE       |
| 8. THRUST WASHER       | 22. GREASE FITTING     |
| 9. STEERING ARM        | 23. AXLE               |
| 10. SHIM               | 24. BEARING CUP        |
| 11. COTTER PIN         | 25. FORK               |
| 12. AXLE NUT           | 26. BUSHING            |
| 13. WASHER             | 27. SPRING             |
| 14. TIRE               | 28. PIN                |

AVN000678

Figure 4-30. Tailwheel and fork assembly



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Figure 4-31. Tailwheel assembly

**Note**

Deflating and reinflating tire relieves the pressure of folds or buckles and permits the inner tube to assume proper contours within the tire.

j. Remove valve core from air valve to deflate tire (9) completely. Reinstall valve core in air valve and inflate to 35 psi (40 psi on aircraft modified to 2800-pound gross weight configuration). Use a suitable tire gage during inflation to avoid overinflation.

k. Paint a red stripe 1 inch wide by 2 inches long across wheel rim and tire sidewall to provide visual means of detecting tire slippage.

**Note**

A valve cap will be installed on each air valve to prevent dirt, oil, and moisture entering air valve and serve as protection in event of valve core failure.

l. Under normal conditions, allow the tailwheel assembly to remain static for a 24-hour period and then check for air leaks or other defects. If tailwheel assembly is found completely serviceable, install valve cap on air valve and place in service or reduce air pressure to 20 psi for shipment or storage.

**4-344. INSTALLATION.**

a. Position tailwheel assembly (15, figure 4-30) in fork (25), and install axle (23), washers (13), axle nut (12), and cotter pin (11).

b. Lower fuselage from jack and remove jack.

c. Lubricate tailwheel assembly in accordance with lubrication chart (figure 2-2).

**4-345. FORK ASSEMBLY.**

4-346. The fork assembly consists primarily of a bracket (1, figure 4-30), thrust plate (4), steering arm (9) and

fork (25). The fork assembly houses the tailwheel assembly and is attached to the leaf spring assembly.

#### 4-347. REMOVAL.

a. Remove tailwheel assembly in accordance with paragraph 4-338.

b. Remove steering spring assemblies (12, figures 4-29 and 4-29A) at steering arm (17) and rudder bellcrank.

c. Aircraft not modified to the 2800-pound gross weight configuration:

(1) Remove eyebolt (19, figure 4-29), bushing (13), washers (14), spacer (18), and nut (15).

(2) Separate fork assembly (16) from leaf springs (30).

d. Aircraft modified to the 2800-pound gross weight configuration:

(1) Remove bolt (19, figure 4-29A), washer (14), bushing (13), tiedown fitting (33), and nut (15).

(2) Separate fork assembly (16) from leaf spring (30).

#### 4-348. DISASSEMBLY.

##### Caution

Place removed bearing cones on clean paper to prevent dirt or other foreign matter adhering to or entering the bearings.

a. Remove cotter pin (18, figure 4-30), fork nut (17), washer (16), spacer (19), grease retainer (20), and bearing cone (21) from fork (25).

b. Remove bracket (1), washer (3), thrust plate (4), and spring (5) from fork (25).

c. Remove dust covers (6), thrust washers (8), steering arm (9), and pawl (7) from fork (25).

d. Remove pin (28), shims (10), and spring (27) from fork (25).

e. Remove bushing (26) and bearing cup (24) from fork (25).

4-349. CLEANING. Wash metal parts with drycleaning solvent (item 4, table 1-6) and dry with compressed air.

#### 4-350. INSPECTION.

a. Inspect metal parts for cracks, scratches, burrs or nicks, distortion, malformed threads, and corrosion.

b. Inspect bearing cone and cup for brinelling, burrs or nicks, distortion, and corrosion.

4-351. REPAIR OR REPLACEMENT. Repair consists of replacing unserviceable components with like serviceable components.

#### 4-352. REASSEMBLY.

a. Insert bearing cup (24, figure 4-30) and bushing (26) in fork (25).

b. Install spring (27), shims (10), and pin (28) in fork (25).

##### Caution

Position pawl with 0.162-inch ear (long ear) downward into the thrust washer slot.

c. Install dust covers (6), thrust washers (8), steering arm (9), and pawl (7) on fork (25).

d. Insert springs (5) in spring recesses of fork (25).

e. Install thrust plate (4), washers (3), and bracket (1) on fork (25).

f. Insert bearing cone (21), grease retainer (20), and spacer (19) in fork (25) and install washer (16), fork nut (17), and cotter pin (18).

#### 4-353. INSTALLATION.

##### Caution

If bushing (13, figure 4-29 or 4-29A) is not flush with bracket, spot face or grind to make flush and coat with primer (item 24, table 1-6).

a. Aircraft not modified to the 2800-pound gross weight configuration:

(1) Position spacer (18) and fork assembly (16) on leaf springs (30).

(2) Install eyebolt (19), bushing (13), washers (14), and nut (15).

(3) Tighten nut (15) to a torque of 600 to 650 inch-pounds.

b. Aircraft modified to the 2800-pound gross weight configuration.

(1) Position spacer (18, figure 4-29A) and fork assembly (16) on leaf springs (30).

#### Caution

Do not substitute AN960 type washers for washers, Part No. AN122585 or 0642162-1.

#### Note

Use washer, part No. 0642162-1, as required, under washer (14) for bolt grip.

(2) Install bolt (19), bushing (13), washer (14), and nut (15).

(3) Tighten nut (15) to a torque of 650 to 700 inch-pounds.

c. Connect steering spring assemblies (12) to steering arm (17) and rudder bellcrank.

#### Note

If slack is evident in chain after installation, remove links as required.

d. Install tailwheel assembly in accordance with paragraph 4-344.

#### 4-354. LEAF SPRING ASSEMBLY.

4-355. The leaf spring assembly consists of a multileaf spring constructed of spring steel and is used to absorb landing shock.

#### 4-356. REMOVAL.

a. Jack fuselage in accordance with instructions under JACKING, Chapter 1, Section III.

b. Remove fork assembly in accordance with paragraph 4-347 b. and c., or b and d.

c. Remove nuts (7, figure 4-29 or 4-29A), stiffener (8), and U-bolt (21) from channel (6) and mounting bracket (22).

d. Loosen channel (6) by removing bolts (9) and nuts (10).

e. Remove bolt (4), washer (3), and nut (23) from channel (6) and mounting bracket (22).

f. Remove leaf springs (30) and spacers (32, figure 4-29A only) from mounting bracket (22, figure 4-29 or 4-29A). Remove bushing (31) from leaf springs.

g. Remove bolts (5), washers (2), nuts (1), and channel (6) from fuselage.

h. Remove bolts (25), spacers (24), nuts (28), and block (29) from mounting bracket (22).

4-357. CLEANING. Clean metal parts with drycleaning solvent (item 4, table 1-6) and dry with compressed air.

4-358. INSPECTION. Inspect parts for cracks, distortion, malformed threads, and corrosion.

#### Note

On O-1D, O-1E, TO-1E, O-1F, and O-1G aircraft not modified to the 2800-pound gross weight configuration, leaf spring, Part No. 0642159, is to have only one attaching hole. The attaching hole is to be in the 5.22-inch leg. Leaf springs with the attaching hole in the 6.09-inch leg are unserviceable. If a serviceable leaf spring, Part No. 0642159, is not available, use spring assembly, Part No. 0642150-20. The exposed part of the tail wheel main leaf spring that extends from the adjacent leaf to the tail wheel assembly will not be painted. This area will be coated with engine oil.

4-359. REPAIR OR REPLACEMENT. Repair of the leaf spring assembly consists of replacing unserviceable components with like serviceable components.

#### 4-360. INSTALLATION.

a. Position block (29, figure 4-29 or 4-29A) in mounting bracket (22) and install bolts (25), spacers (24), and nuts (28). Tighten nuts to a torque of 50 to 70 inch-pounds.

b. Position channel (6) on fuselage and install bolts (5), washers (2), and nuts (1).

c. Aircraft not modified to the 2800-pound gross weight configuration.

(1) Insert bushing (31, figure 4-29) in leaf springs (30) and position leaf springs in mounting bracket (22).

(2) Install bolt (4), washers (3), and nut (23) in channel (6) and mounting bracket (22). Tighten bolt to a torque of 160 to 190 inch-pounds.

(3) Install bolts (9) and nuts (10) in channel (6).

(4) Position stiffener (8) on channel (6) and install U-bolt (21) and nuts (7).

(5) Install fork assembly in accordance with paragraph 4-353 a.

(6) Lower fuselage from jack and remove jack.

d. Aircraft modified to the 2800-pound gross weight configuration.

(1) Insert bushing (31, figure 4-29A) in leaf springs (30).

(2) Install spacers (32), Part No. 0600523-9 and/or 0600523-25, between top spring leaf (30) and channel (6), as required, to allow installation of bolt (9) and nut (10).

(3) Position stiffener (8) and draw U-bolt (21) tight with nuts (7).

(4) Install bolt (4), washer (3) and draw up tight with nut (23).

(5) Install bolts (9) and nuts (10) in channel (6).

#### Note

Install spacer (32), as required, to align holes in the mounting bracket (22) and channel (6) and spacer under stiffener (8). Omit spacers as necessary for bolt clearance.

e. Install fork assembly in accordance with paragraph 4-353 b.

f. Lower fuselage from jack and remove jack.

#### 4-361. TANDEM LANDING GEAR ASSEMBLY.

4-362. A tandem landing gear assembly (figure 4-32) may be installed on each main landing gear spring to permit smoother and safer landing and takeoff on extremely rough, sandy, or soft fields which are impractical for aircraft equipped with standard landing gear. The installation offers increased tire contact for soft fields and increased cantilever action to diminish landing gear shock on rough fields.

#### 4-363. REMOVAL.

a. Jack aircraft until tandem landing wheels clear the parking surface. (Refer to instructions under JACKING, Chapter 1, Section III, for procedure.)

b. Block rear wheel as shown in figure 4-32 to reduce tension on rear shock cord (1).

#### Note

Only the rear wheel in each wheel and cabane assembly is equipped with a brake assembly.

c. Remove bleeder screw and washer from brake housing and drain hydraulic fluid into a receptacle.

d. Disconnect brake hose (7, figure 4-33) at brake housing elbow and elbow on towing lug. Remove brake hose.

#### Warning

Reduce tension on each shock cord during removal of shock cords by blocking adjacent wheel as shown in figure 4-32.