

SECTION 10

RUDDER CONTROL SYSTEM

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10-1. RUDDER CONTROL SYSTEM. (Refer to figure 10-1.)

10-2. DESCRIPTION. Rudder control is maintained through use of conventional rudder pedals which also control nose wheel steering. The system is com-

prised of rudder pedals, cables and pulleys, all of which link the pedals to the rudder and nose wheel steering. Cable tension is automatically determined when the rudder pedals are rigged against return springs 6.50 inches from firewall.

10-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to re-rig system, refer to paragraph 10-11.

TROUBLE	PROBABLE CAUSE	REMEDY
RUDDER DOES NOT RESPOND TO PEDAL MOVEMENT.	Broken or disconnected cables.	Open access plates and check visually. Connect or replace cables.

10-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BINDING OR JUMPY MOVEMENT OF RUDDER PEDALS.	Cables too tight.	Refer to figure 10-2 for distance between firewall and pedals. Rig system in accordance with paragraph 10-11.
	Cables not riding properly on pulleys.	Open access plates and check visually. Route cables correctly over pulleys.
	Binding, broken or defective pulleys or cable guards.	Open access plates and check visually. Replace defective pulleys and install guards properly.
	Pedal bars need lubrication.	Refer to Section 2.
	Defective rudder bar bearings.	If lubrication fails to eliminate binding. Replace bearing blocks.
	Defective rudder hinge bushings.	Check visually. Replace defective bushings.
	Clevis bolts too tight.	Check and readjust bolts to eliminate binding.
LOST MOTION BETWEEN RUDDER PEDALS AND RUDDER.	Steering rods improperly adjusted.	Rig system in accordance with paragraph 10-11.
	Insufficient cable tension.	Refer to figure 10-2 for distance between firewall and pedals. Rig system in accordance with paragraph 10-11.
INCORRECT RUDDER TRAVEL.	Incorrect rigging.	Rig in accordance with paragraph 10-11.

10-4. RUDDER PEDAL ASSEMBLY. (Refer to figure 10-2.)

10-5. REMOVAL AND INSTALLATION.

- Remove carpeting, shields and soundproofing from pedal and tunnel areas as necessary.
- Disconnect master cylinders (12) at pilot rudder pedals.
- Disconnect parking brake cables at master cylinders.
- Remove rudder pedals (2) and brake links (5).
- Thru Aircraft Serial 17263809 and F17201324, relieve cable tension at turnbuckles (index 6, figure 10-1); beginning with Aircraft Serial 17263810 and F17201325, relieve cable tension at clevises (index 11, figure 10-1).
- Disconnect cables, return springs and steering tubes from rudder bars.

- Remove bolts securing bearing blocks (8) and work rudder bars out of tunnel area.

NOTE

Rudder bar assemblies should be checked for excessive wear before installation. The bearing blocks are nylon and require no lubrication unless binding occurs. A few drops of general purpose oil should eliminate such binding.

- Reverse preceding steps for installation. Rig system in accordance with applicable paragraph in this section. Safety turnbuckles or clevises, as applicable, and reinstall all items removed in step "a".

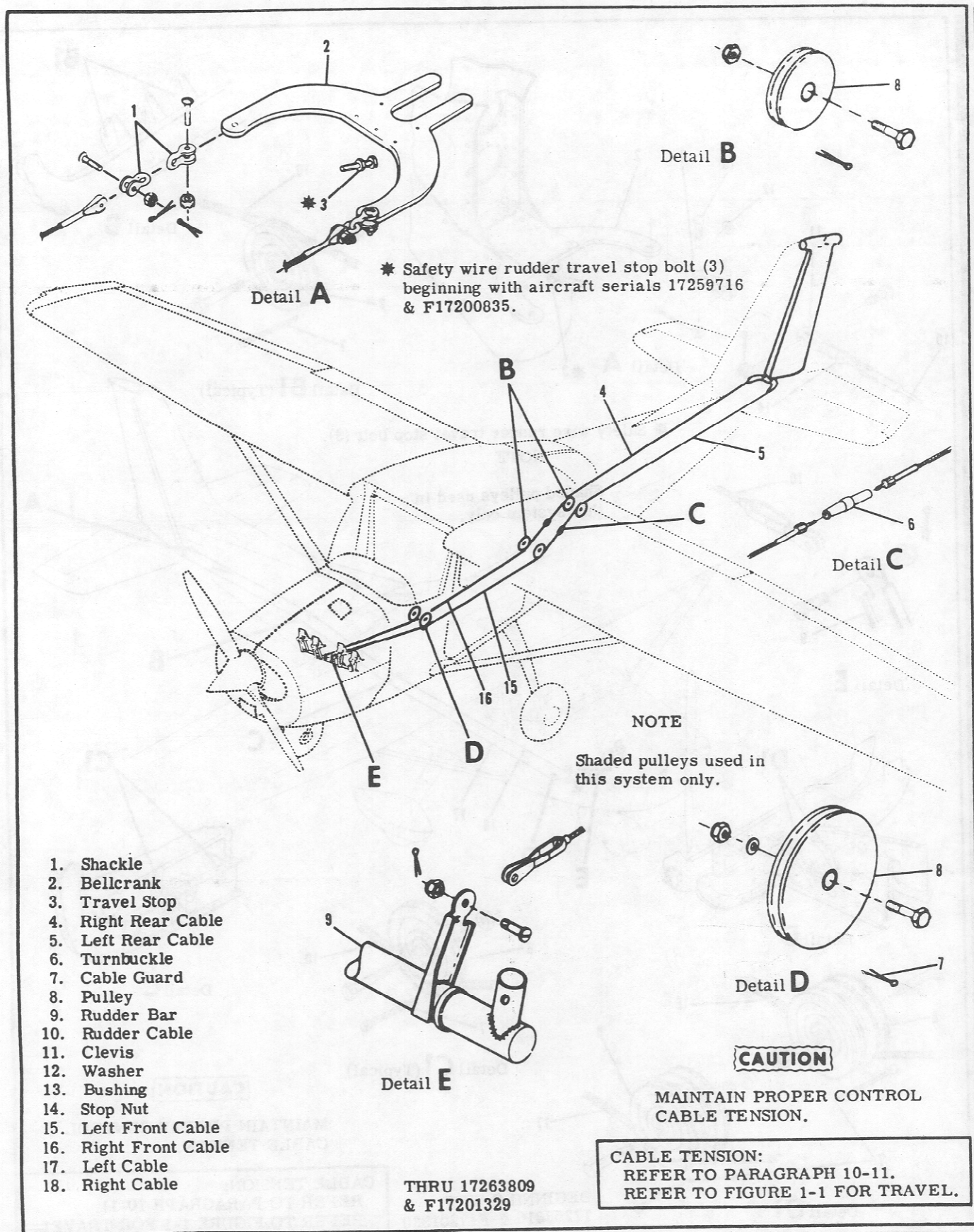


Figure 10-1. Rudder Control System (Sheet 1 of 2)

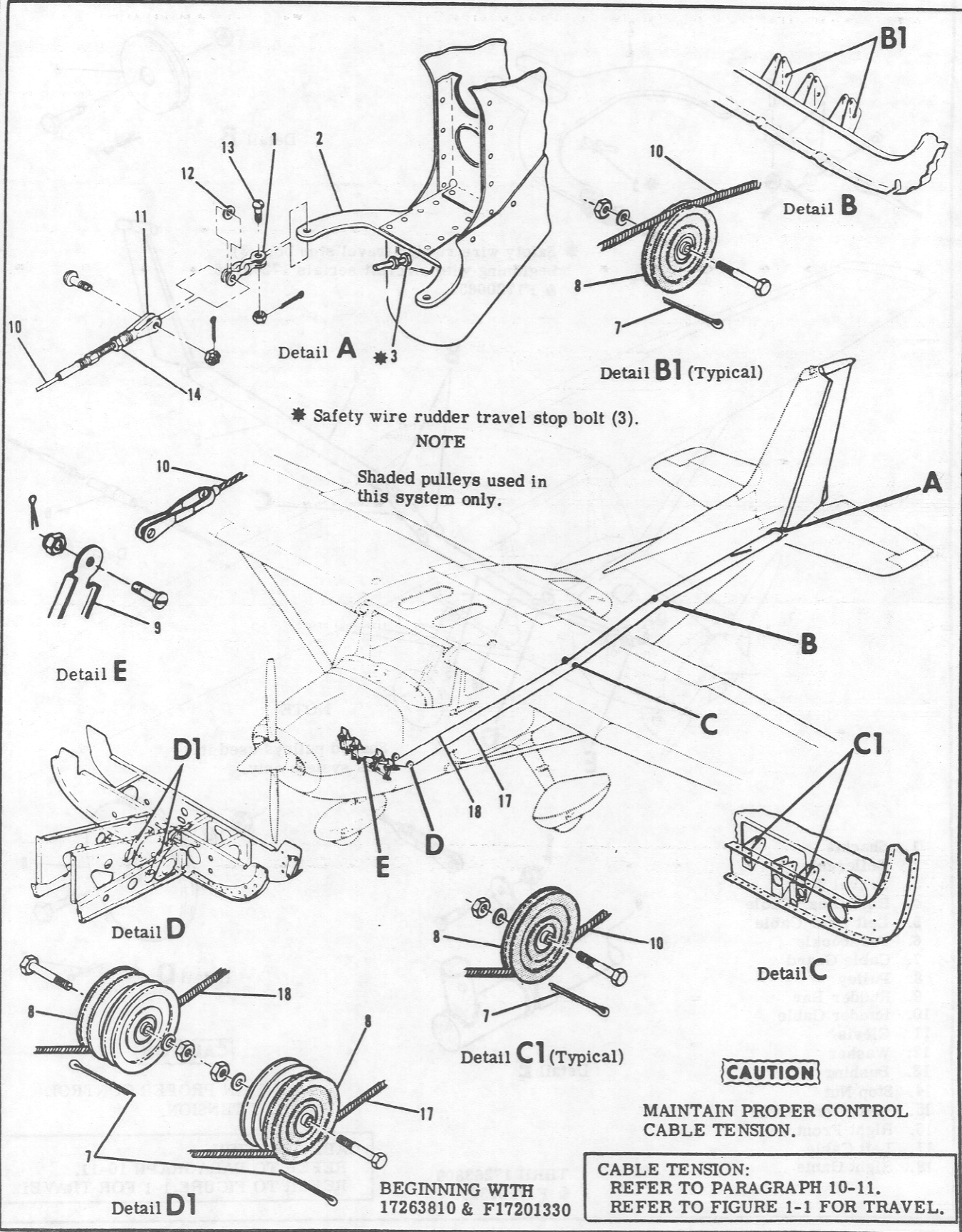


Figure 10-1. Rudder Control System (Sheet 2 of 2)

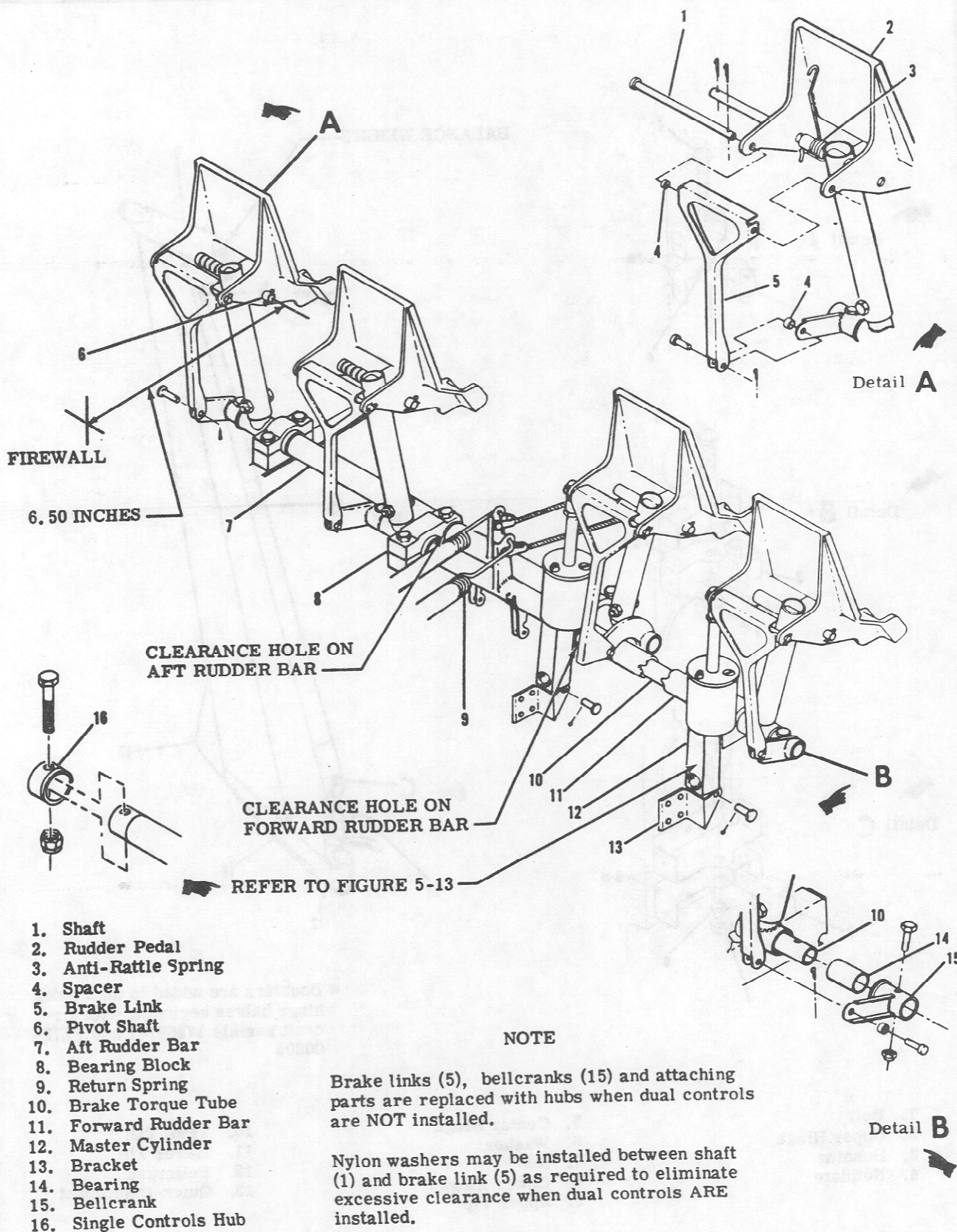
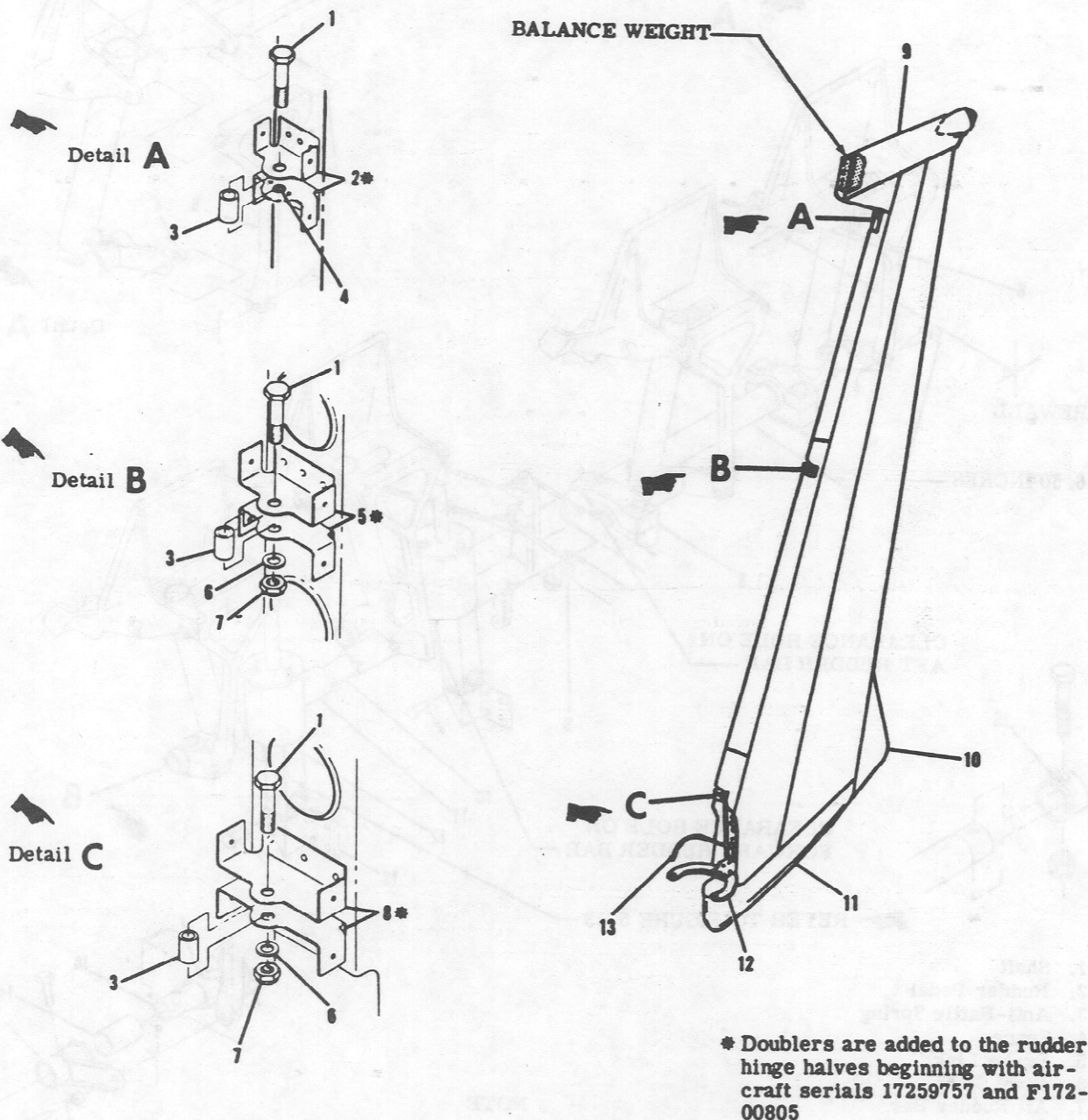


Figure 10-2. Rudder Pedals Installation



* Doublers are added to the rudder hinge halves beginning with aircraft serials 17259757 and F172-00805

- | | | |
|----------------|-----------------|----------------------|
| 1. Bolt | 5. Center Hinge | 10. Trim Tab |
| 2. Upper Hinge | 6. Washer | 11. Lower Tip |
| 3. Bushing | 7. Nut | 12. Bellcrank |
| 4. Nutplate | 8. Lower Hinge | 13. Quick-Disconnect |
| | 9. Upper Tip | |

Figure 10-3. Rudder Assembly

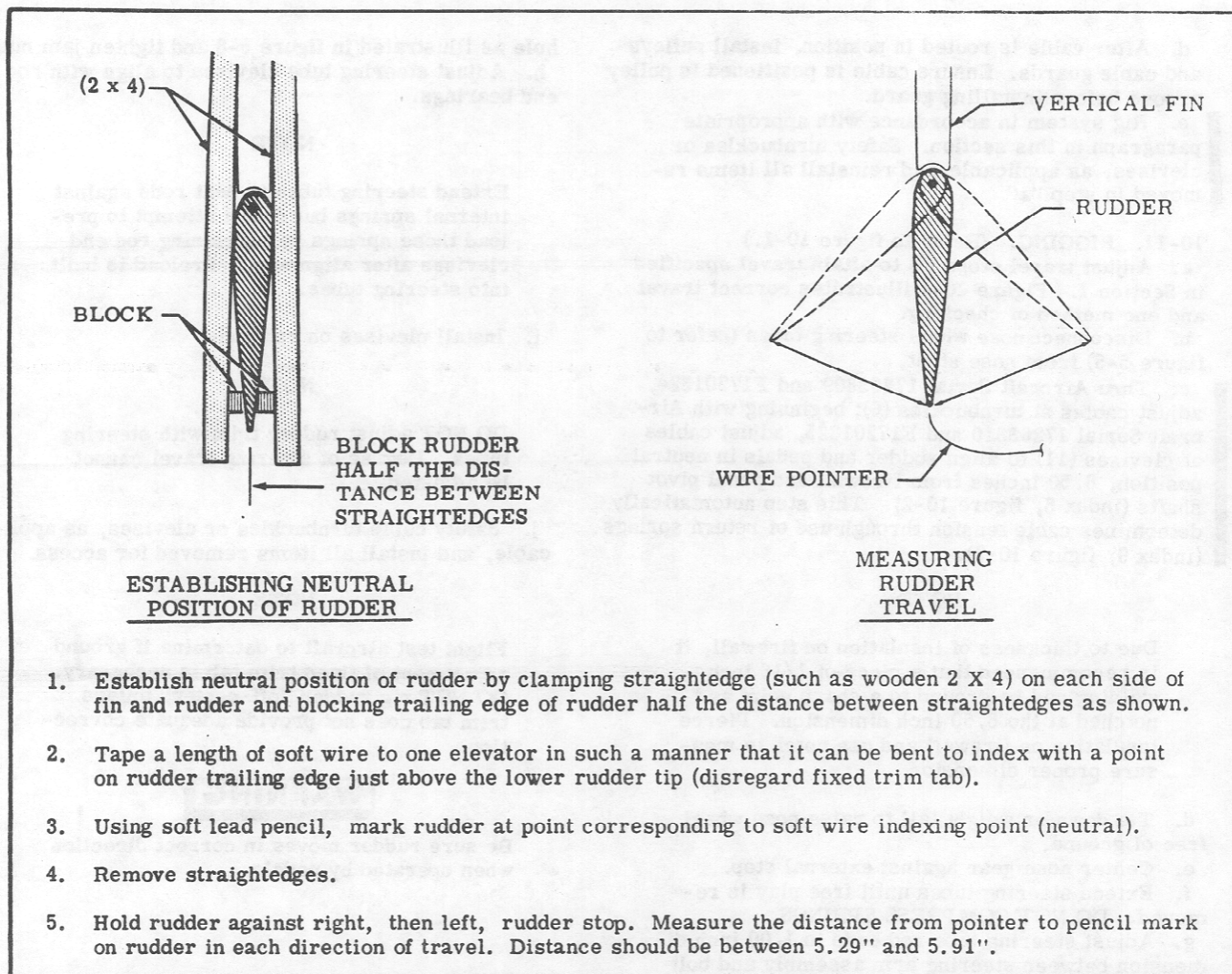


Figure 10-4. Checking Rudder Travel

10-6. RUDDER. (Refer to figure 10-3.)

10-7. REMOVAL AND INSTALLATION.

- a. Disconnect tail navigation light quick-disconnect (13).
- b. Thru Aircraft Serial 17263809 and F17201324, relieve cable tension at turnbuckles (index 6, figure 10-1) and disconnect cables from rudder bellcrank (12). Beginning with Aircraft Serial 17263810 and F17201325, relieve cable tension at clevises (index 11, figure 10-1) and disconnect clevises from rudder bellcrank (12).
- c. With rudder supported, remove hinge bolts (1) and lift rudder free of vertical fin.
- d. Reverse preceding steps for installation. Rig system in accordance with appropriate paragraph in this section and safety turnbuckles or clevises, as applicable.

10-8. REPAIR. Repair may be accomplished as outlined in Section 18. Hinge bushings may be replaced as necessary.

10-9. CABLES AND PULLEYS. (Refer to figure 10-1.)

10-10. REMOVAL AND INSTALLATION.

- a. Remove seats, upholstery and access plates as necessary.
- b. Disconnect cable at rudder bar (9) and bellcrank (2).
- c. Remove cable guards and pulleys as necessary to work cables free of aircraft.

NOTE

To ease routing of cables, a length of wire may be attached to end of cable before being withdrawn from aircraft. Leave wire in place, routed through structure, attach cable being installed and pull cable into position.

d. After cable is routed in position, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guard.

e. Rig system in accordance with appropriate paragraph in this section. Safety turnbuckles or clevises, as applicable, and reinstall all items removed in step "a".

10-11. RIGGING. (Refer to figure 10-1.)

a. Adjust travel stops (3) to attain travel specified in Section 1. Figure 10-4 illustrates correct travel and one method of checking.

b. Disconnect nose wheel steering tubes (refer to figure 5-5) from nose strut.

c. Thru Aircraft Serial 17263809 and F17201324, adjust cables at turnbuckles (6); beginning with Aircraft Serial 17263810 and F17201325, adjust cables at clevises (11) to align rudder and pedals in neutral position, 6.50 inches from firewall and pedal pivot shafts (index 6, figure 10-2). This step automatically determines cable tension through use of return springs (index 9, figure 10-2).

NOTE

Due to thickness of insulation on firewall, it is recommended that a piece of 1/16 inch welding rod be ground to a sharp point and notched at the 6.50 inch dimension. Pierce insulation on firewall and use notch to measure proper dimension.

d. Tie down or weight tail to raise nose wheel free of ground.

e. Center nose gear against external stop.

f. Extend steering tubes until free play is removed. DO NOT COMPRESS SPRINGS.

g. Adjust steering tube rod ends to 1.00 inch dimension between steering arm assembly and bolt

hole as illustrated in figure 5-8 and tighten jam nuts.
h. Adjust steering tube clevises to align with rod end bearings.

NOTE

Extend steering tubes to seat rods against internal springs but do not attempt to preload these springs by shortening rod end clevises after alignment. Preload is built into steering tubes.

i. Install clevises on rod ends.

NOTE

DO NOT adjust rudder trim with steering tubes. Degree of steering travel cannot be adjusted.

j. Safety cable turnbuckles or clevises, as applicable, and install all items removed for access.

NOTE

Flight test aircraft to determine if ground adjustment of fixed trim tab is necessary. DO NOT rig rudder "off-center" unless trim tab does not provide adequate correction.

WARNING

Be sure rudder moves in correct direction when operated by pedals.