

Chapter 4B FLYING CONTROLS - COCKPIT CONTROLS

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DESCRIPTION

Control column (fig.1)

General information

1. The control column consists of a lower and an upper member and a control handle. The complete column, mounted in a structure bolted to the cockpit floor, pivots fore-and-aft for tail-plane control, but only the upper member and handle pivot laterally for aileron control.

Lower member

2. For fore-and-aft movement the lower and upper member move as one unit, pivoting in the mounting structure. A control rod connected to the fork-end at the bottom of the lower member communicates, through the control run, the fore-and-aft movement of the control column to the tail-plane p.f.c.u. The lower member also contacts the adjustable stops which limit the fore-and-aft movement.

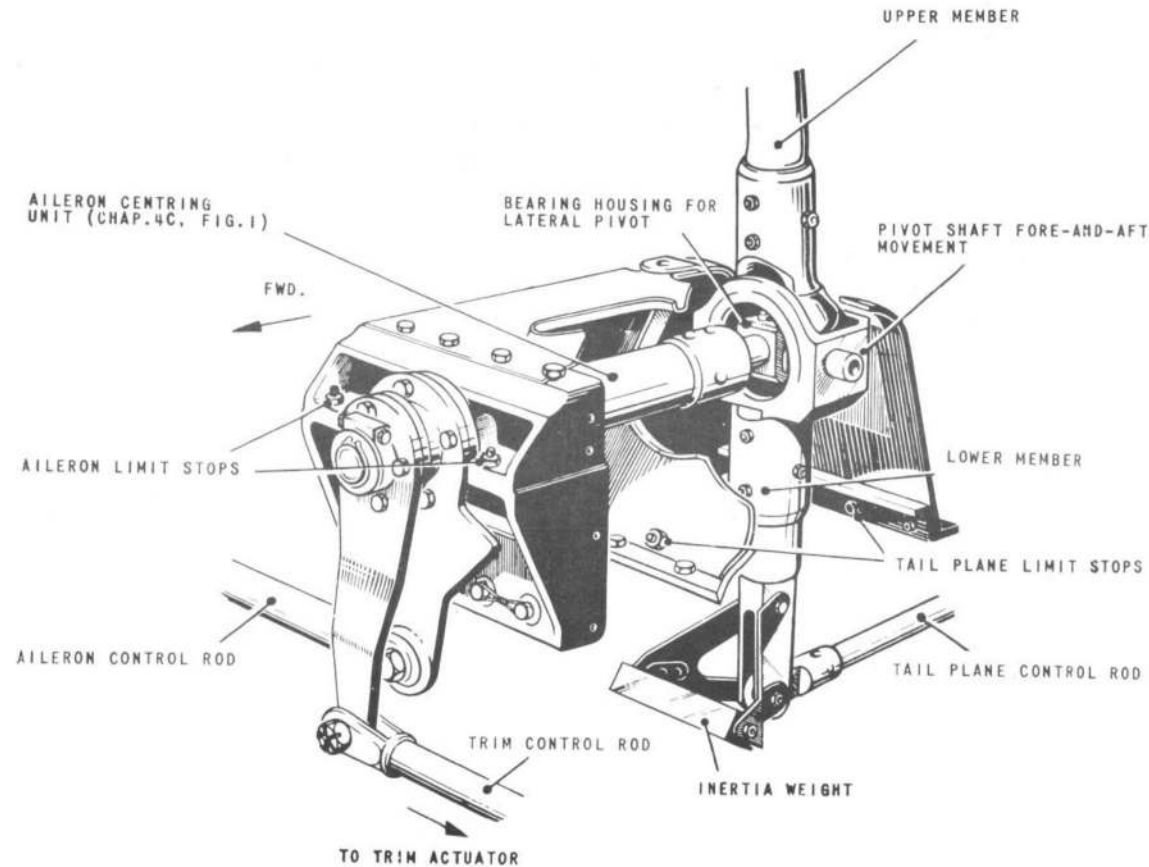


Fig. 1. Control column

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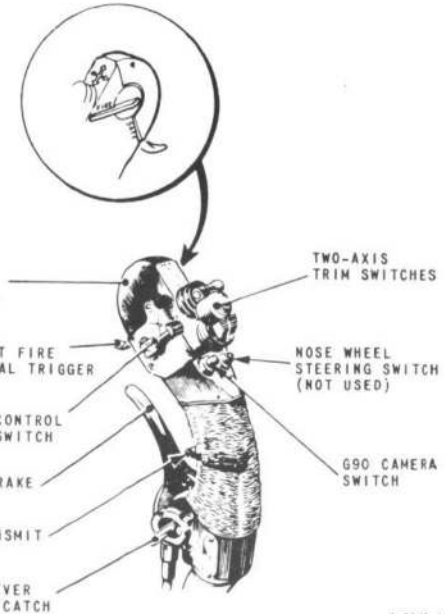


Fig. 2. Control handle

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Upper member

3. The upper member pivots laterally about its attachment to the lower member and rotates a combined torque tube and centring unit which terminates in a lever. A control rod connected to the lever transmits movement to the control run which operates the aileron p.f.c.u.

Control handle (fig. 2)

4. A control handle is fitted to the upper member of the control column. At the base of the handle is the wheel-brake lever with its associated parking catch on the port side. A press-to-transmit switch is housed in a boss half-way up the grip on the port side. The top of the handle accommodates switches for the camera, nose-wheel steering (not used), autopilot and coupled 4-way trim switches. At the front of the handle is the armament firing trigger with its safety catch on the starboard side. Datum marks for

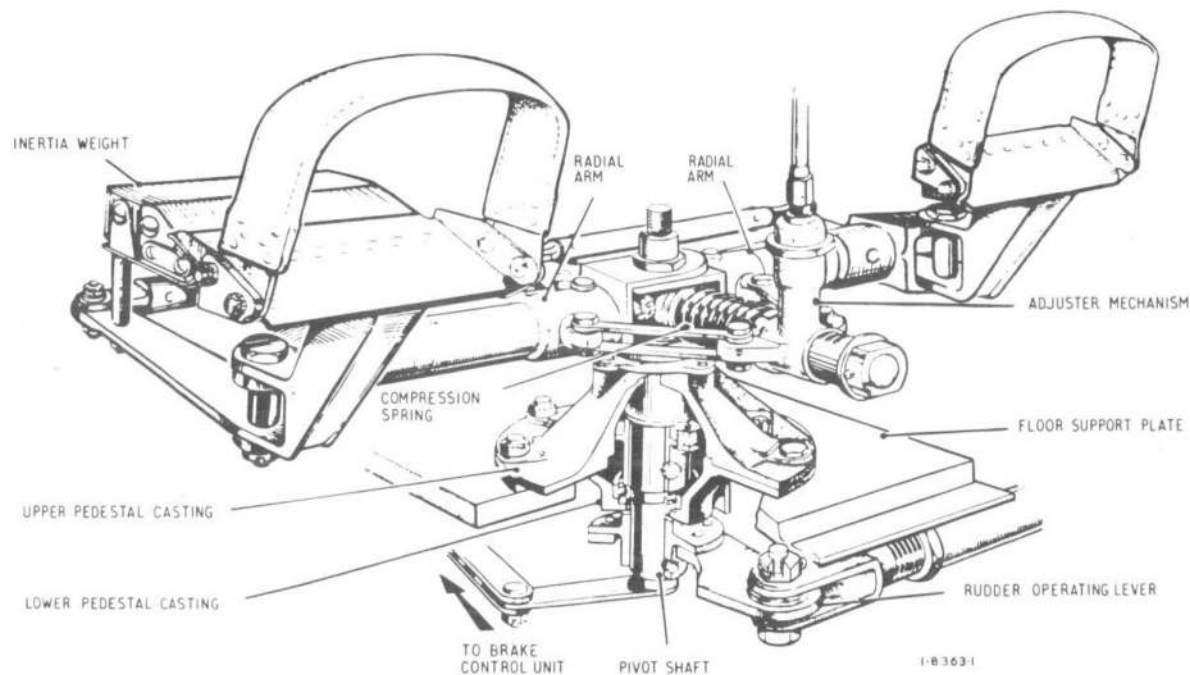


Fig. 3. Rudder bar (pre Mod. 86 or 177)

◀ MECHANISM REDRAWN ▶

control column rigging are inscribed on the port side of the handle.

Limit stops (fig. 1)

5. Fore-and-aft movement of the control column, for tail-plane control (Chap. 4E), is limited by adjustable stops screwed into the mounting structure. The aft stop, i.e., control column forward, is accessible from outside the control-column mounting structure; the forward stop can be adjusted through a cut-out in the starboard side of the mounting structure. Lateral movement of the control column, for aileron control, is

limited by adjustable stops, at the forward end of the mounting structure, which are accessible externally.

Rudder bar

General information (fig. 3 and 4)

6. The rudder bar assembly is mounted on a vertical pivot shaft, supported in a pedestal bolted to the cockpit floor. Levers below the floor transmit movement to the rudder control rods and the wheel brake control unit operating rods. The pedal arms have fork-ends which fit on to the pivot shaft, and an adjuster mechanism locks the two arms together,

so that they pivot about the pivot shaft as a single unit.

Limit stops (fig. 5)

7. Movement of the rudderbar is limited by an arm on the pivot shaft which protrudes through a slot in the pedestal and contacts adjustable limit stops on the pedestal.

Leg-reach adjustment (fig. 6 and 7)

8. The rudder pedals are adjusted for leg reach by pulling out a handle, fitted above the oxygen regulator prior to Mod. 177, and above the centre instrument panel on post Mod. 177 and Mk. 1A aircraft. Pulling out the handle raises the toothed plunger and frees it from the rack, allowing the compression spring to push the plunger housing assembly towards the pilot. The links joining the pedal arms to the plunger housing move the pedals in the same direction, the pedal arms pivoting about the pivot shaft. When the plunger is released the pedals can be moved to the desired position by the pilot's feet, and then locked by releasing the T-handle to allow the spring-loaded plunger to re-engage the rack.

Neutral-setting rig (fig. 8)

9. The neutral-setting rig (Sect. 2, Chap. 4) is provided for rigging purposes only. Control locking for parking or picketing is not necessary as the flying controls are hydraulically locked. ▶

To fit the rig:-

- (1) Set the rudder bar to the neutral position.

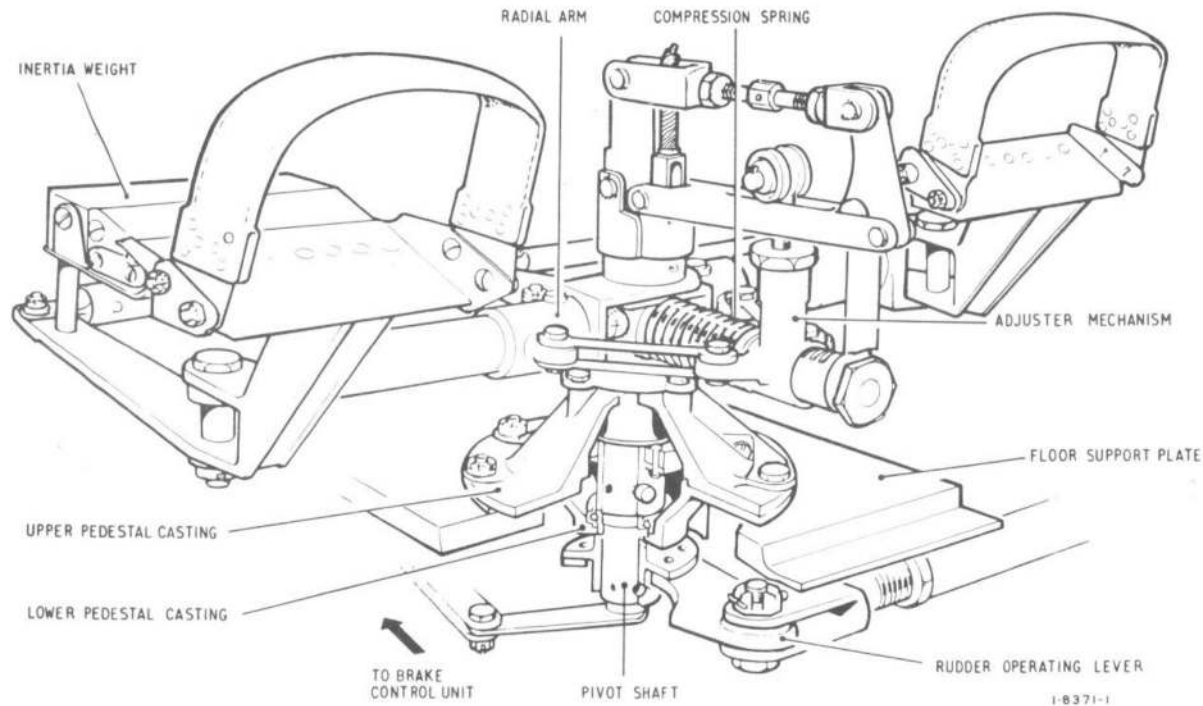


Fig. 4. Rudder bar (post Mod. 86 or 177)

(2) Fit item 1 into the slot in the rudder bar pedestal, ensuring that the arm on the pivot shaft engages the cut-away in item 1.

(3) Secure the split-rings around the limit stop adjusting screws.

(4) Tighten the knurled nuts until item 1 is held firmly in position (avoid over-tightening).

(5) Position the platform of item 2 at the base of the control column.

(6) Slide the clamping block into position and secure it to the platform with the two retaining bolts.

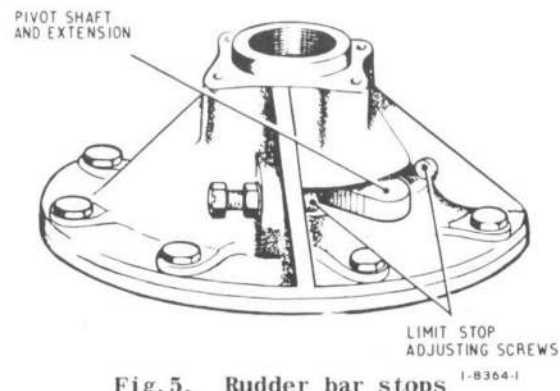


Fig. 5. Rudder bar stops

Trim switches

10. Rudder trim is controlled by two 2-way switches on the port console which are normally operated together. Aileron and tail-plane trim is effected by dual 4-way switches on the control handle (fig. 2). The switches are moved fore-and-aft for tail-plane trim and laterally for aileron trim (Sect. 6, Chap. 3).

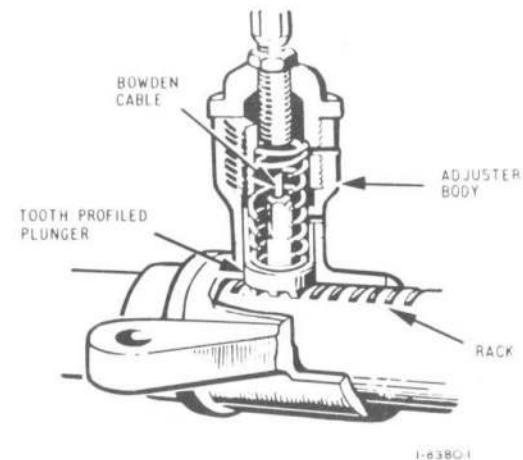


Fig. 6. Leg-reach adjustment mechanism (pre Mod. 86 or 177)

Flap selector

11. The flap selector, located on the port coaming panel, has two marked positions, UP and DOWN. The selector controls the solenoids of an electro-hydraulic selector valve which directs the flow of hydraulic fluid to the flap jacks (Chap. 6). If the flaps are left 'down' a pitot pressure switch, operating at 250 knots, returns them, during flight, to 'up'.

Air-brake selector

12. The air-brake selector switch is mounted on the No.2 engine power control handle. Movement of the switch aft selects airbrakes OUT; forward movement selects air brakes IN. The switch is spring-loaded to the centre 'off' position.

Position indicators

13. A combined indicator, showing the trim position about the three axes of the aircraft, the air-brakes position, and the 'air brakes in and locked' condition, is on the port instrument panel with the flaps position indicator just below it.

SERVICING**WARNING**

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cockpit or performing any operations upon the aircraft.

General information

14. Inspection for security and freedom of movement without noticeable backlash, checking for cleanliness, and lubrication, are the main servicing requirements.

Lubrication

15. The key to the lubricant symbols is given in fig.9. The nomenclature, and the reference and N.A.T.O. code numbers of the lubricants are given on the back of the contents marker card at the front of this book. Ball-bearings in the assemblies are pre-packed with grease and do not normally require attention.

Resetting the rudder pedal adjuster-lock mechanism (post Mod.86 or 177) (fig.10)

16. To reset the mechanism:-

(1) Gain access to the lock-release

handle assembly, forward of the centre instrument panel, and to the rudder bar assembly.

(2) Check that the lifting link, over the rack, is not disturbed and that the cable conduit is correctly seated at both ends. If necessary, slacken the locknut and turn the adjuster to achieve these conditions.

(3) Slowly pull the handle until the plunger of the lifting rod assembly is just free from engagement with the rack. Retain the handle in this position.

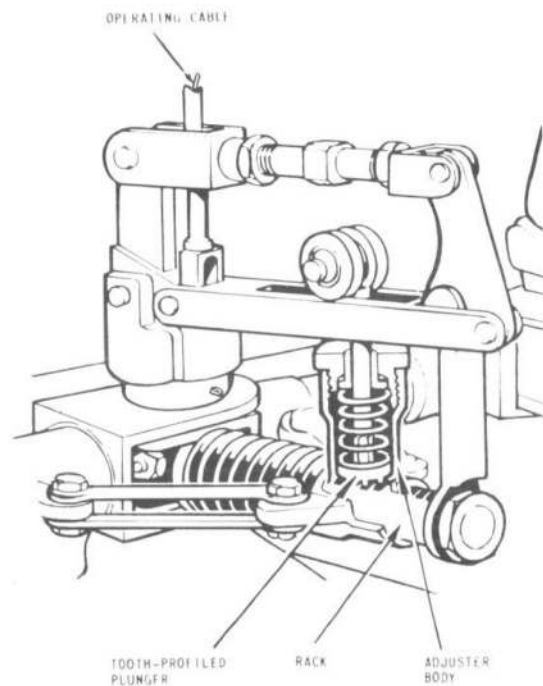


Fig. 7. Leg-reach adjustment mechanism (post Mod.86 or 177)

(4) Check the position of the stop collar on the pull rod; the collar should be bearing against the front end of the guide tube. If a gap exists, remove the locking screw, slide the collar along the rod to abut the tube and secure with a new locking screw. Peen the end of the locking screw. Release the handle.

(5) Check that the ball races on the lifting rod are just free to rotate at all positions throughout the fore-and-aft travel of the lifting rod assembly. If necessary, remove the locking wire, slacken the locknuts and adjust the turnbuckle to achieve this condition. If the settings obtained in (2) are disturbed readjustment of the cable assembly is permissible.

Note...

The friction in this mechanism must not be sufficient to deter the spring from returning the linkage to the normal position on release of the handle.

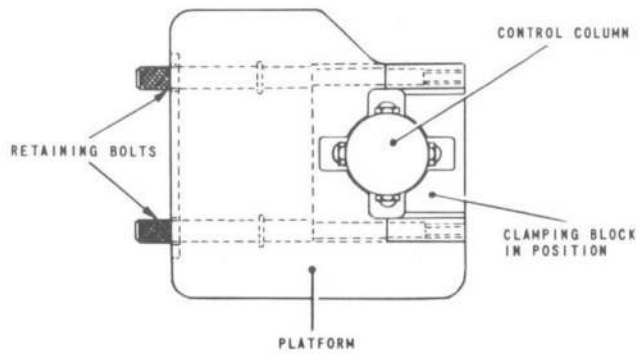
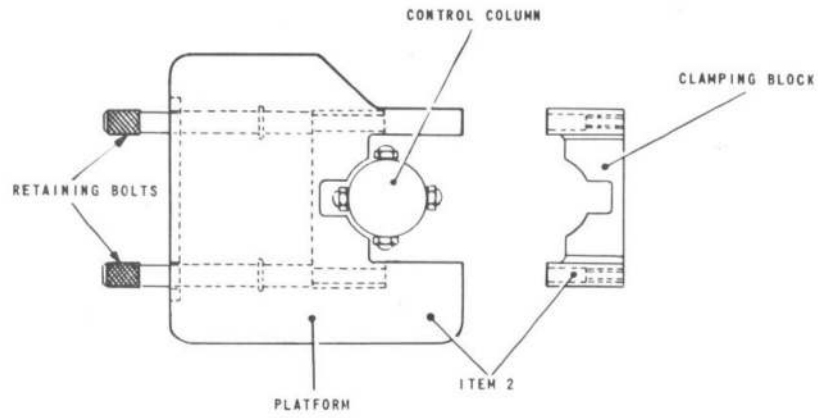
(6) Pull the handle fully out and retain it in this position. Ensure that the rack compression spring returns the pedals to the aft position. Attach a spring balance at the centre line of one of the pedals and check that an applied forward load of 3 lb is not sufficient to move the pedal. Remove the spring balance. Release the handle.

(7) Check that, with one pedal locked, the movement of the other pedal does not exceed 0.080 in.

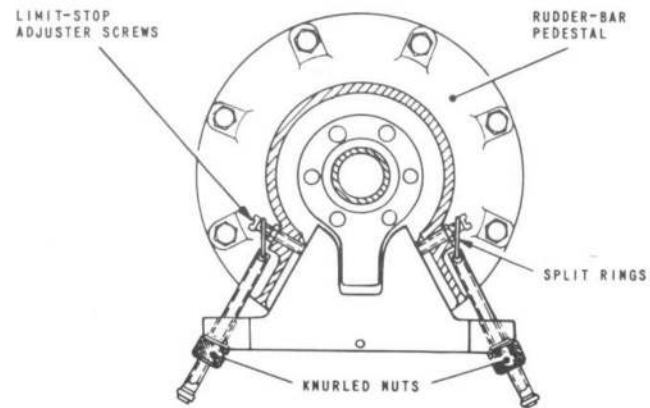
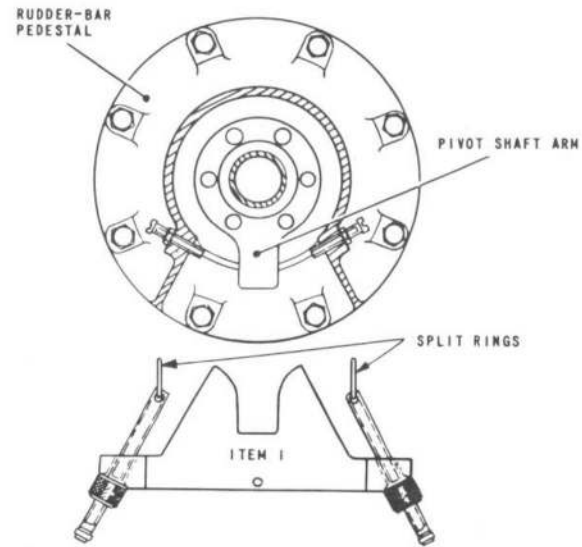
(8) On completion of satisfactory adjustment, tighten the locknut on the cable adjuster and the locknuts on the turnbuckle. Lock the turnbuckle with 22 s.w.g. locking wire D.T.D.189.

(9) Lubricate the pin joints of the handle mechanism with grease XG-287. ◀ ▶

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PLAN VIEW ON CONTROL COLUMN



PLAN VIEW ON RUDDER PEDESTAL

FIG. 8. NEUTRAL-SETTING RIG

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A.P.101B-1001-1A, Sect. 3, Chap. 4B
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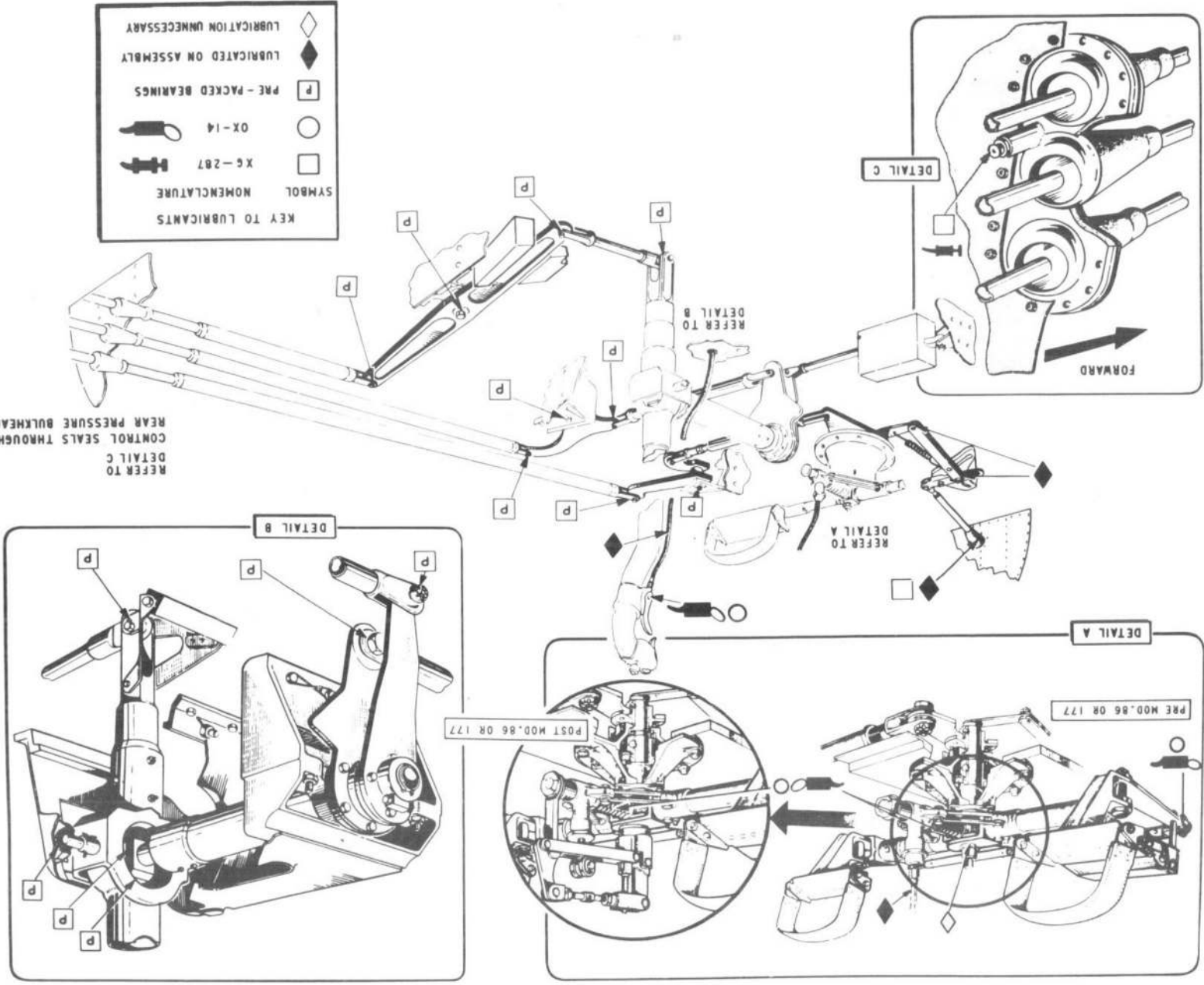
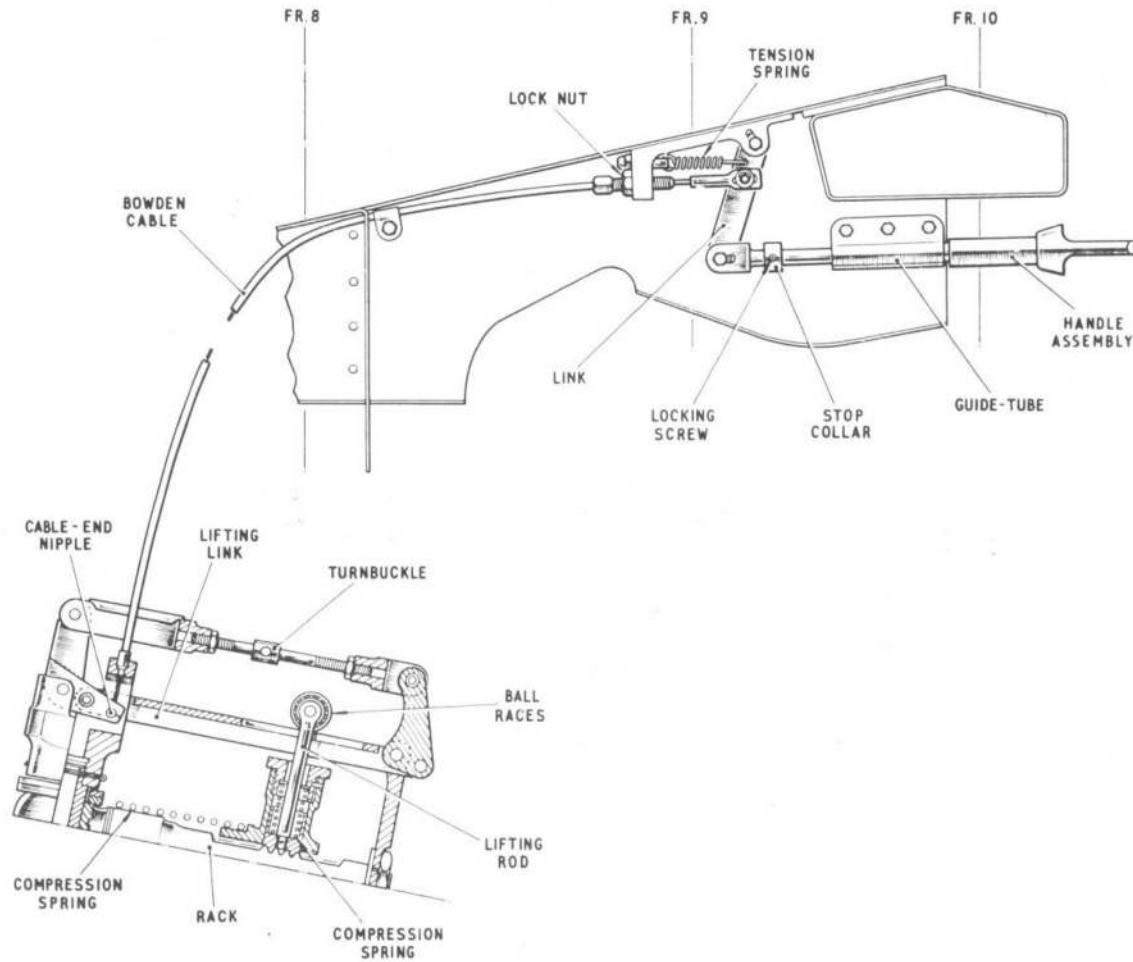


FIG. 9. LUBRICATING POINTS
MECHANISM AMENDED

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Fig. 10. Arrangement of rudder pedal adjuster-lock mechanism (post Mod 86 or 177)

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