PROPELLER (McCAULEY) - MAINTENANCE PRACTICES

1. General

A. Maintenance practices for the propeller consists of removal, installation and adjustment/test. Adjustment/test include the beta feedback collar axial runout check.

B. To do a functional test for the dynamic balancing of the propeller refer to Propeller (McCauley- Adjustment and Test.

2. Propeller Removal/Installation

A. Remove Propeller (Refer to Figure 201).

CAUTION: Do not forcibly pull the feedback collar against the guide which limits the forward travel.

(1) Ensure airplane electrical power is OFF.

(2) Open upper right hand cowling and remove right nose cap. Refer to Chapter 71, Engine Cowling and Nose Cap - Maintenance Practices.

(3) Disconnect propeller reversing lever (26) from control cable and beta valve clevis (25).

(4) Remove propeller reversing lever (26) and carbon block (24) from propeller feedback collar (23). Refer to Pratt & Whitney Engine Maintenance Manual for removing the propeller reversing lever.

(5) Remove spinner (17) by removing screws (19) and fiber washers (18).

(6) If propeller anti-ice is installed, loosen nuts securing anti-ice brush block assembly (22) and carefully insert an electrical tie strap between brushes and slip ring (15). Secure brushes in holder and remove brush block assembly and bracket.

(7) Install assembly tool, D-5945, on forward end of beta rods (5).

NOTE: Do not disturb beta rod nuts. The position of beta rod nuts, with respect to the beta rod, determines the low pitch setting.

NOTE: Adjustment of low pitch setting may only be performed by an approved propeller repair station.

(8) Pull beta rods forward until roll pin on tool bottoms against the plate. This will position feedback collar forward to make mounting nuts accessible.

(9) Attach lifting sling to hoist and position hoist forward of the airplane. Attach sling to propeller by positioning blades at 10 O'clock and 2 O'clock.

(10) Position drip pan under propeller to catch residual oil which will drain from the propeller when removed.

(11) Remove mounting nuts (9) and spacers (8).

(12) With propeller supported by the sling, remove propeller from engine flange (10).

(13) If removal of the spinner bulkhead (13) is required on standard propeller, remove screws (11) and washers (12) and remove bulkhead. On propeller with anti-ice installation, remove screws securing anti-ice leads (21) to slip ring (15) and screws securing lead clamps to bulkhead.

B. Install Propeller (Refer to Figure 201).

(1) Ensure airplane electrical power is OFF.

(2) If spinner bulkhead (13) was removed, position spinner bulkhead on propeller and install washers (12) and screws (11). Torque screws (11) 20 to 25 inch-pounds.

(3) On propeller with anti-ice installation, install screws securing anti-ice leads (21) to slip ring (15) and secure leads to bulkhead using screws and clamps removed.

(4) Install D-5945 tool.

(5) Apply a light coating of engine oil to O-ring (14) and install in the propeller hub.

(6) Inspect stud and nut threads for cleanliness and absence of nicks, burrs or other damage.

(7) Apply MIL-PRF-83483C lubricant liberally to propeller studs, nut threads and both faces of spacers (8).

CAUTION: It is important that propeller be seated against engine flange with a straight push. Rotation, cocking or wiggling will damage the o-ring groove and oil leakage may result.

(8) With propeller supported by a hoist and sling position propeller on engine flange (10) and install spacers (8) and nuts (9). Using the B-5588 torque wrench adapter or equivalent, torque nuts 68 to 72 foot-pounds.

(9) On propeller with anti-ice installation, install anti-ice brush block assembly (22). Clearance between anti-ice brush block and slip ring is 0.064 inch, +0.015 or -0.015 inch. Torque the nuts that attach the brush block bracket assembly to the engine from 145 to 165 inch-pounds (16.38 to 18.64 N-m).

(10) Remove D-5945 tool.

NOTE: The lower end of the propeller reversing lever is machined with a stepped notch.

CAUTION: Make sure the stepped notch at the end of the propeller reversing lever (26) is under the guide pin (37) in the reversing lever guide pin bracket (36).

(11) Install propeller reversing lever (26) and carbon block (24) in propeller feedback collar (23). Refer to Pratt & Whitney Engine Maintenance Manual for installing the propeller reversing lever.

(12) Connect propeller reversing lever (26) to control cable and beta valve clevis (25).

(13) Slide spinner support (1) on feathering spring housing (2).

CAUTION: Preform the following procedure exactly as written to prevent damage.

(14) Lightly press spinner (17) against spinner support (1) and check alignment of spinner holes with spinner bulkhead holes. Spinner holes should be approximately 1/2 hole diameter forward from alignment with bulkhead holes. If not add or remove shims (16) to obtain this alignment.

(15) Once shimming is complete, push hard on front of spinner to align holes and install screws (19) and washers (18).

(16) Install right nose cap half and close cowling.

3. Adjustment/Test

A. Beta Feedback Collar Axial Runout Check.

NOTE: Checking adjustment of the beta feedback collar axial runout is not required unless there is reason to believe linkage settings have been tampered with or feedback ring is bent.

(1) Open right upper cowling door.

(2) Remove right nose cap half.

(3) Clamp dial indicator in position to check axial runout of forward face of beta feedback collar groove.

(4) Rotate propeller by hand and check that axial runout does not exceed 0.010 inch total indicator reading and that there is no binding between carbon block and feedback collar.

NOTE: The carbon block initially supplied with each propeller has been prefitted. If a different carbon block is being installed, it may be necessary to sand it to obtain a total clearance between the carbon block and side of the groove of 0.001 inch to 0.002 inch at the tightest point. If clearance between feedback carbon block and groove of feedback collar exceeds 0.010 inch, replacement of feedback carbon block assembly is required.

4. Propeller Blade Damage

A. A propeller blade is highly stressed. The fact that propeller blades are likely to be subjected to damage such as nicks, gouges, scratches, corrosion pits, etc. demands frequent inspection and maintenance.

(1) Refer to McCauley MPC26 Owner/Operator Information Manual for propeller blade inspection and repair information (refer to List of Vendor Publications).

(2) Repair of small nicks and scratches may be performed by qualified mechanics in the field in accordance with procedures specified in McCauley MPC26 Owner/Operator Information Manual also FAA Advisory Circular 43.13-1A. However, whenever a significant amount of metal is removed, or in the case of previously reworked blades which may be at or near the minimum width and thickness limits, the propeller shall be inspected by a McCauley FAA approved propeller repair station to determine if the minimum allowable blade width and thickness limits have not been exceeded. If the limits have been exceeded, blade replacement is required. If not, after filing and polishing, the damaged area should be inspected by fluorescent dye penetrant method to verify all damage has been removed and the blade is not cracked. The area should then be protected by localized application of chemical film per MIL-C-5541 (e.g. Alodine) and repainted per manufacturers instructions as necessary.

(3) Large nicks or scratches or other damage involving such things as bent blades, balance, diameter reduction etc. should be corrected only by a McCauley FAA approved propeller repair station.

(4) Damage to blade anti-ice boots may conceal blade damage. Damage must be given careful inspection, anti-ice boot elasticity may obscure blade damage. If boot is damaged or cut completely through to the blade, or if blade damage

is suspected, the boot must be removed for blade inspection/repair. A damaged boot may result in an electrical open or short circuit in the boot heating element. Boot replacement is required. A damaged heating element may also cause arcing to the blade surface. Damage of this type may also require blade replacement. Refer to Chapter 30 for anti-ice boot replacement.

5. Propeller Corrosion

A. Aluminum alloys used in propeller blades are susceptible to corrosion. The degree of corrosion likely to occur is largely dependent upon environmental exposure. If a painted or anodic blade surface is penetrated by stone damage etc., the material exposed may corrode if not reprotected. Corrosion may be accelerated if the propeller is operated in industrial or coastal areas.

(1) Preventative measure should be taken. Damaged or blistered paint should be removed and repainted. Blades can be wiped with a cloth dampened with oil or waxed with an automotive type paste wax on a regular basis to minimize corrosion.

(2) If corrosion develops, it should be removed as soon as possible. This can be accomplished by ensuring that blades are frequently inspected for evidence of corrosion. In the early stages, a light polishing is all that is required. However, if the corrosion is deep-seated, further material removal will be required. If a significant amount of metal is removed, or in the case of previously reworked blades which may be at or near the minimum width and thickness limits, the propeller shall be inspected by a McCauley FAA approved propeller repair station to make sure the minimum allowable blade width and thickness limits have not been exceeded. If the limits have been exceeded, propeller blade replacement is required. After the corrosion has been removed, the area should then be protected by localized application of chemical film per MIL-C-5541 (e.g. Alodine) and repainted per the paint manufacturers instructions as necessary.

(3) For propellers operating in corrosive environments, such as agricultural or costal operations:

(a) Clean the area of the propeller blade snap rings and the propeller hub blade sockets with water, soft bristle brush (do not use a hard bristle brush), and clean towel.

1 Remove as much foreign material from the propeller blade retaining ring area as possible.

(b) Make sure the propeller blade retaining ring area is dry.

(c) Apply LPS 3® Rust Inhibitor to the retaining ring area at the base of the propeller blades and hub sockets.

(d) Apply LPS 3® as frequently as necessary to prevent corrosion.

6. Propeller Grease or Oil Leakage

NOTE: The presence of oil or grease deposits on a nacelle does not necessarily indicate the propeller is leaking; leakage can come from the engine.

A. On new propellers, slight grease leakage during the first several hours of operation is no cause for concern. Lubricants used during the assembly of shims at the propeller blade shank are liberally applied. Even though they are cleaned prior to shipment, centrifugal forces during the first hours of operation can result in grease streaks on the blades. Such leakage will normally cease within the first ten hours of operation.

B. A propeller oil leak can come from (1) the engine lubricating system or (2) the propeller hub cavity which holds approximately 2 quarts of turbine oil and is independent of engine oil.

(1) Leakage of engine oil would normally come from piston O-rings and be observed around the tool attachment holes on the forward end of the propeller cylinder. Repair of such leaks can sometimes be performed, (by a propeller repairman) without removing the propeller from the engine.

(2) Loss of small amounts of oil from the hub cavity need not be immediately replenished. The hub contains more oil than is needed for propeller lubrication. If leak persists the source must be determined and corrected, and oil replenished per McCauley MPC700 Propeller Overhaul Manual (refer to List of Vendor Publications).

(3) Leakage from the hub cavity normally requires repair by an approved propeller repair station. However, if leakage is determined to be coming from a blade shank O-ring (blade to hub seal), before removing the propeller for repair, wipe off residue, run engine and cycle propeller pitch. After shutdown inspect for leaks; if no leakage is observed propeller may be returned to service (blade O-rings sometimes have a friction/stretch problem causing a leak which can be cured by recycling propeller pitch).

C. If propeller leakage is suspected, but the source is not readily apparent, before removing propeller from airplane.

(1) Remove propeller spinner.

(2) Wipe clean all propeller, flange and spinner bulkhead parts.

(3) Use White "Dy-Check" developer or prepare a solution of alcohol and chalk dust to coat the hub and blade shank areas.

CAUTION: Do not attempt engine run up without spinner installed unless spinner bulkhead fillets and anti-ice leads have been removed.

(4) After solution drys, reinstall spinner and run engine for at least five minutes.

(5) Shut down engine and examine coated surfaces. The sources of any leakage will show as a stain on the coated surfaces.

(6) If it is definitely established that propeller is leaking, remove propeller and mark so proper inspection can be made during disassembly by an authorized propeller repair station.

D. If leakage is shown only through engine shaft and hub flanges, it is not necessary to overhaul propeller. Remove propeller and carefully inspect end of engine shaft and propeller hub to determine cause of O-ring damage. After correction, install new O-ring and reinstall propeller.

CAUTION: Under no circumstances should an additional or oversize o-ring be used.

E. Internal leakage. An internal O-ring failure could allow propeller oil from the hub cavity into the engine lubricating system. The propeller uses turbine oil which is compatible with engine oil. An indication of propeller internal leakage would be an unexplainable increase in engine oil level. If this occurs the propeller hub oil level should be checked, if abnormally low, remove the propeller for repair by an approved McCauley propeller repair station.

Figure 201 : Sheet 1 : McCauley Propeller Installation

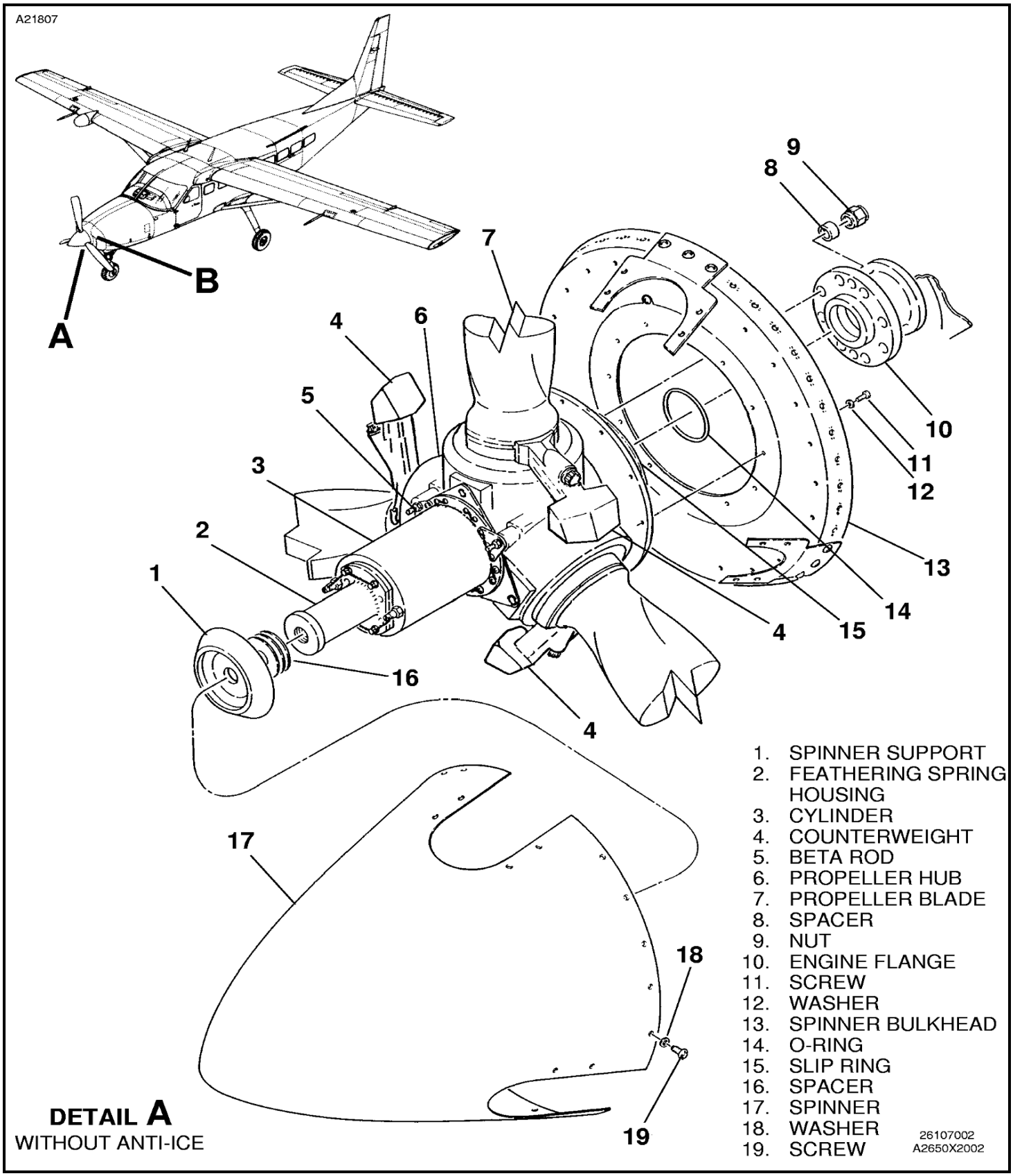


Figure 201 : Sheet 2 : McCauley Propeller Installation

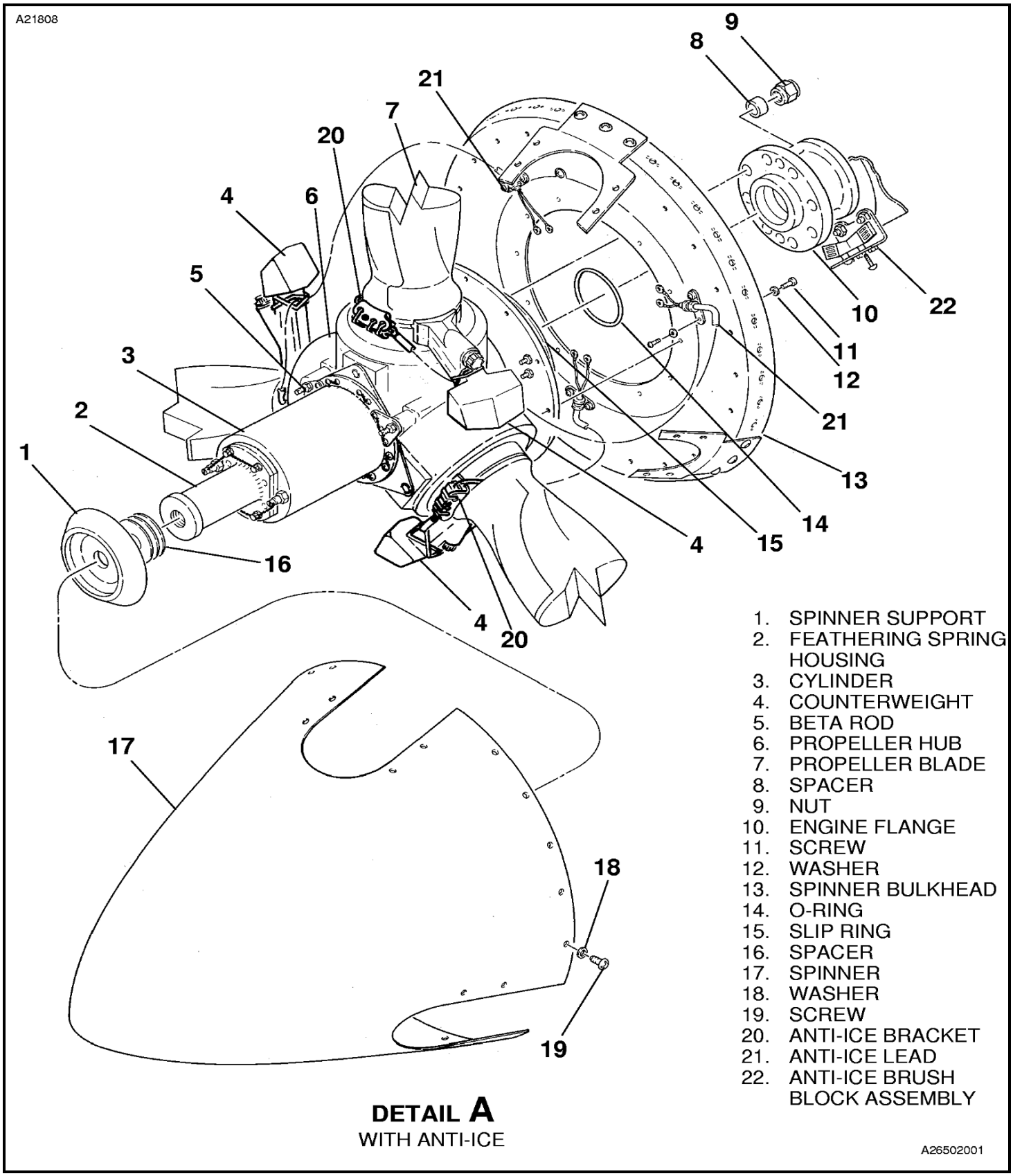
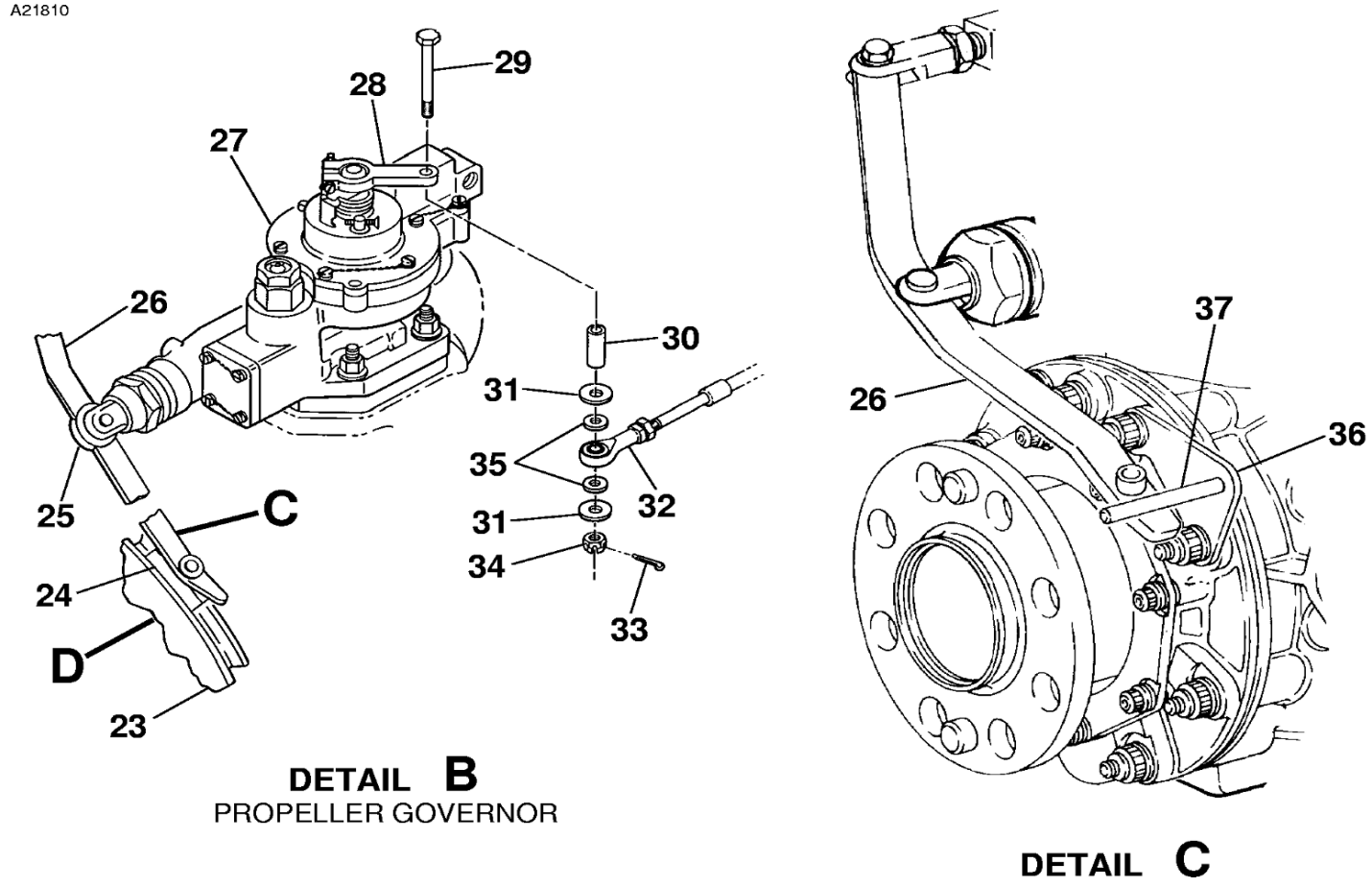


Figure 201 : Sheet 3 : McCauley Propeller Installation



23. FEEDBACK COLLAR
24. CARBON BLOCK
25. BETA VALVE CLEVIS
26. REVERSING LEVER
27. GOVERNOR
28. SPEED ADJUSTING LEVER
29. BOLT
30. SPACER
31. WASHER
32. SPEED CONTROL CABLE ROD END
33. COTTER PIN
34. NUT
35. WASHER
36. GUIDE PIN BRACKET
37. GUIDE PIN

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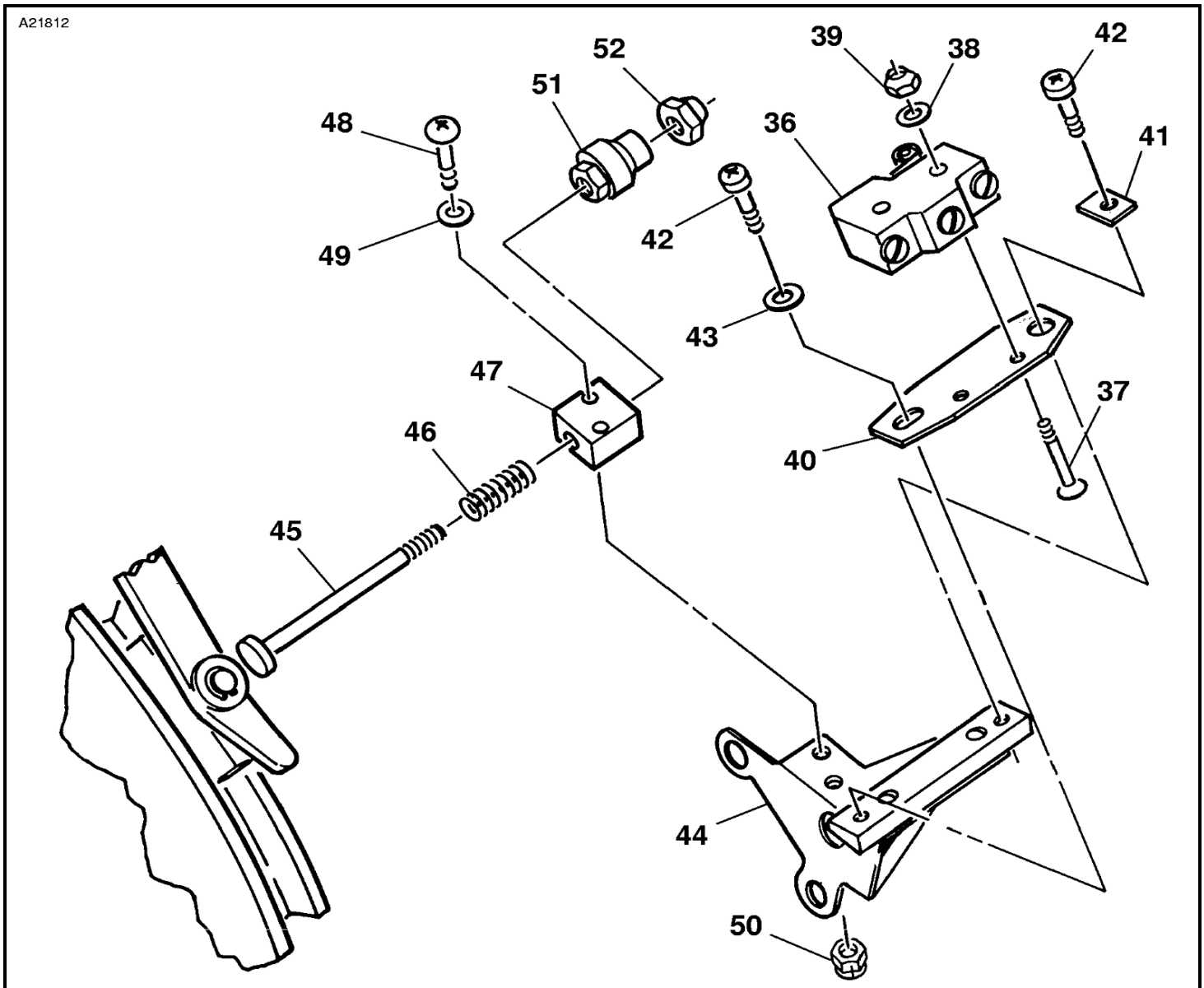
Figure 201 : Sheet 4 : McCauley Propeller Installation



36. BETA SWITCH
37. SCREW
38. NUT
39. WASHER
40. PLATE
41. AFT PLATE
42. SCREW
43. WASHER
44. BETA SWITCH BRACKET
45. PLUNGER
46. SPRING
47. BLOCK
48. SCREW
49. WASHER
50. NUT
51. CAM
52. JAM NUT

DETAIL D

BRAZILIAN AND BRITISH CERTIFIED AIRPLANES
BETA INDICATING SYSTEM

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