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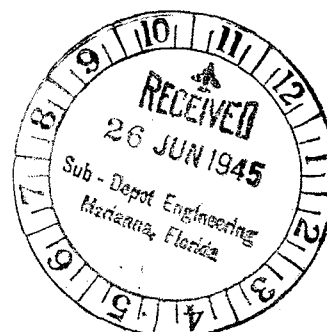
AN 03-20G-1

*HANDBOOK OF INSTRUCTIONS
WITH PARTS CATALOG*

FOR

**MANUAL CONTROLLED
PROPELLER**

MODEL R002
(BEECH)



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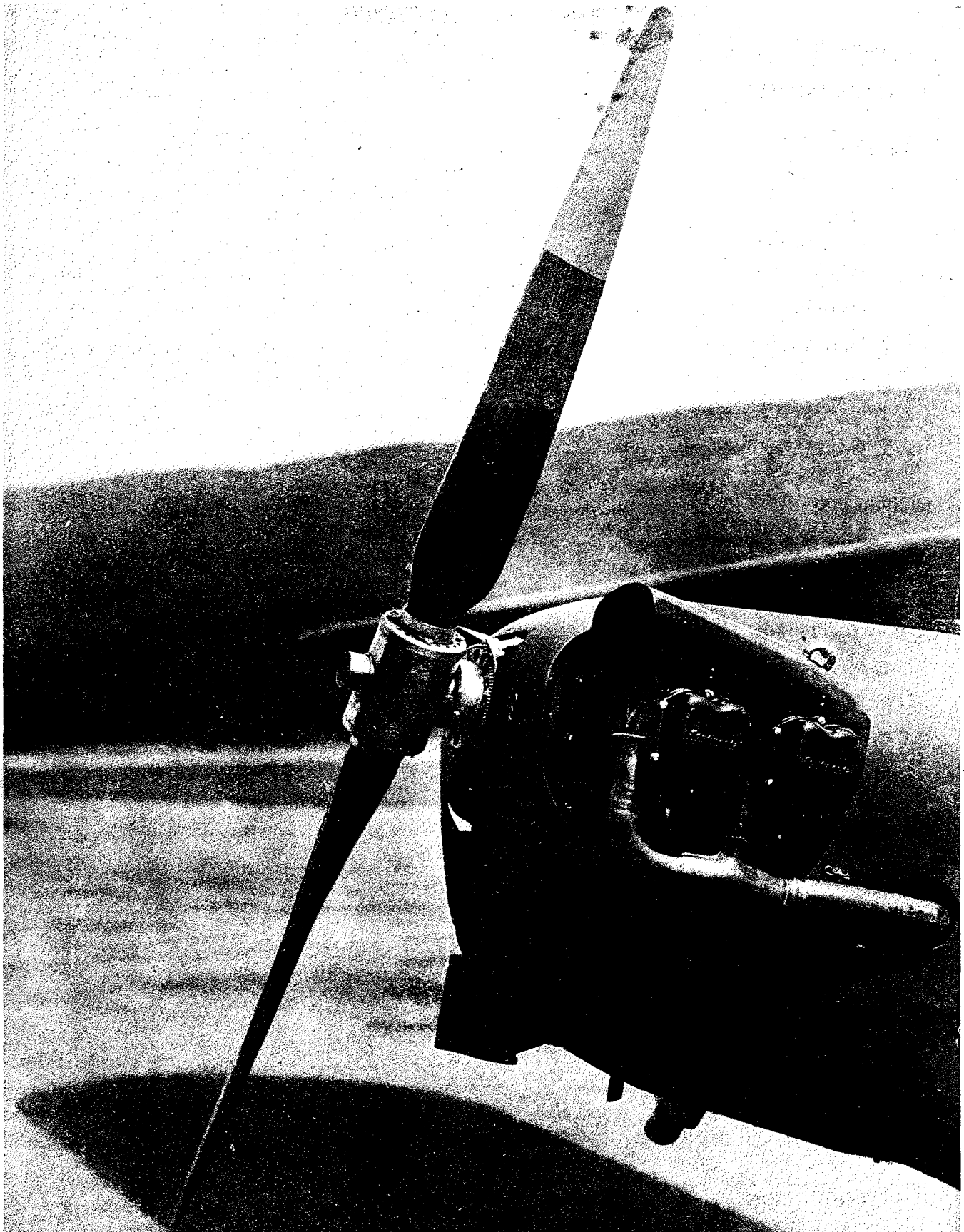


Figure 1—Model R002 Propeller on L-4J Airplane

SECTION I INTRODUCTION

1. This Handbook is issued as the basic technical instructions for the Model R002 propeller as installed on the L-4J airplane.
2. In general, the contents are descriptive data and

instructions for the installation, operation, maintenance, overhaul, and testing of the Model R002, two-blade propeller manufactured by Beech Aircraft Corporation, Wichita, Kansas.

SECTION II DESCRIPTION

1. GENERAL DESCRIPTION.

The various models of the propeller are identified by numbers stamped on the front of the propeller hub.

a. The first letter "R" signifies that the propeller is manufactured under Roby patents.

b. The first two digits of the model number indicate the shaft upon which the hub will fit. For example, the digits "00" indicate the hub will fit a "Continental Modified" SAE 0 tapered shaft.

c. The third digit indicates the major modification number.

d. The illustration shown in figure 1, designated model R002, indicates a propeller with a hub that will fit a "Continental Modified" SAE 0 tapered shaft and is modification No. 2 of the original design. This propeller may be installed on Continental engine numbers A50, A65, A75, and A80.

e. The controllable pitch range of this propeller is 7 1/2 degrees.

2. DETAILED DESCRIPTION.

a. HUB ASSEMBLY.—The hub assembly is machined from three pieces of chrome molybdenum steel tubing and consists of the following parts: The hub barrel, the front hub section, the rear hub section, and the connector which joins the front and rear hub section. The connector contains the bearings for the control arms. Front and rear hub sections are inserted

into the hub barrel, joined by the connector, and the hub assembly is then hydrogen-brazed. After brazing, the assembly is normalized and heat-treated.

b. BLADE ASSEMBLY.—The blade assembly is made of selected birch veneers. The wood is protected by five coats of wood sealer or spar varnish. The outer one third of the blade is protected with a fabric cover. The leading edge and tip is protected with a stainless steel metal "tipping." The blade is held in a steel shank with 12 lag screws.

Note

The thrust bearing and retainer ring are installed on the blade before the shank is installed. If these parts are damaged a new blade assembly must be installed.

c. CONTROL ASSEMBLY.—The control consists of a hand crank, 90-degree drive torque shafts, universals, brackets, bearings, and pinion gear. The hand crank is mounted near the throttle for convenience. When the hand crank is turned, motion is transmitted to the pinion gear by the torque shafts and universal joints. The torque shaft is supported by a bearing aft of the fire wall, a bearing over the left front cylinder of the engine, and by a bearing at the pinion gear. (See figure 2.)

d. PITCH-CHANGE MECHANISM.—The pitch-change mechanism has a large gear that meshes with the pinion gear on the control assembly. About 10

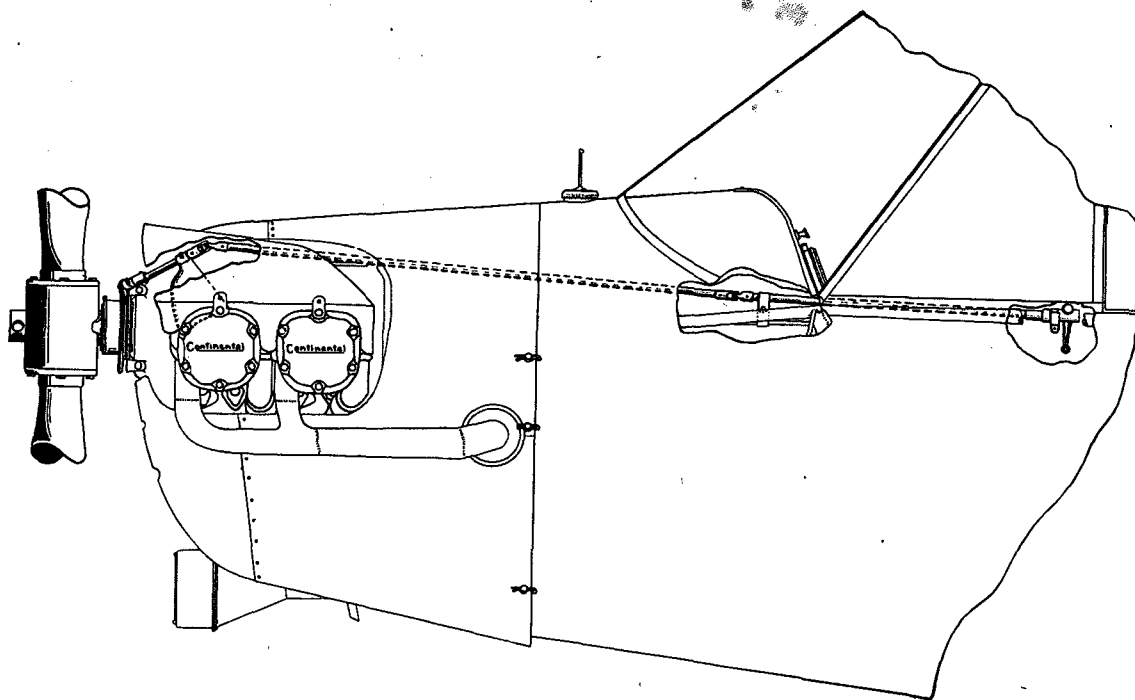


Figure 2—Installation of Model R002 Propeller

per cent of this gear is blank. The blank section serves as the low- and high-pitch position stops. A removable low-pitch position stop is provided on the gear to keep the engine from turning over its rated rpm. (See figure 3.) This gear is rotated by the pinion gear and turns on the pitch-change mechanism sleeve, which is anchored to the engine bracket. The gear has an internal worm machined on the inside of the hub. It is held on the pitch-change mechanism sleeve by a retainer ring.

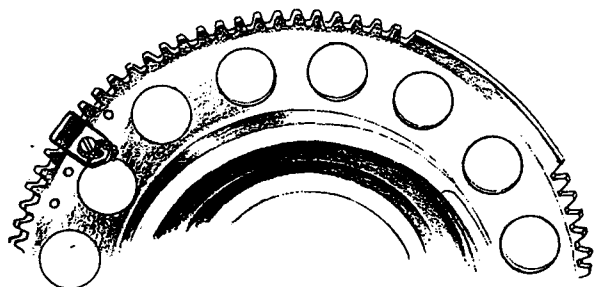


Figure 3—Adjustable Low Pitch Stop

e. ACTUATOR ASSEMBLY.—The actuator assembly consists of the actuator arms and bearing assembly. The actuator arms and inner bearing race are machined from one piece of ball bearing steel. The two actuator arms extend forward into the propeller hub and engage one end of the control arms. The outer race of the actuator bearing has two ears which protrude from it. These ears extend through two slots in the pitch-

change mechanism sleeve and mesh with the internal worm machined into the hub of the pitch-change mechanism gear. When the pitch-change mechanism gear is turned by means of the hand crank, the actuator arms are moved longitudinally by the internal worm. The actuator bearing is factory-lubricated and sealed.

f. CONTROL ARMS.—The control arm has a close-tolerance pivot that fits into a bearing in the hub barrel. One end is machined to fit into the slot in the end of the actuator. The other end is machined to fit into a slot in the base of the propeller blade. The control arm changes the longitudinal motion of the actuator to co-axial motion at the base of the blade. This motion changes the pitch of the blade, as illustrated in figure 4.

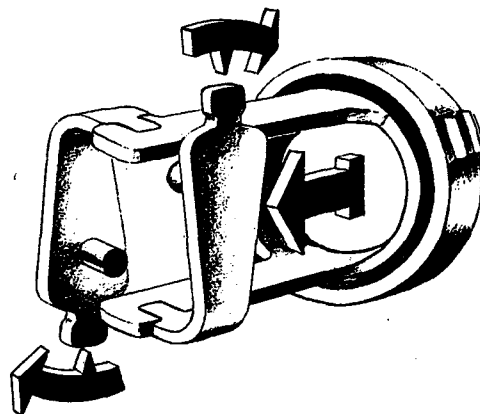


Figure 4—Actuator Assembly and Control Arms

SECTION III INSTALLATION

1. GENERAL.

a. Prior to shipment, each propeller is assembled for balancing and then balanced. The propeller is then fully assembled, lubricated, and thoroughly tested for proper functioning.

b. The propeller is shipped with the propeller shaft nut, propeller shaft lock nut, blade spanner wrench, a propeller shaft nut wrench, a shaft key, and the control assembly. Since the lubricant is fully contained within the propeller, there are no seals required around the propeller shaft.

c. Remove the propeller and control assembly parts from the packing case.

d. Inspect completely for any damages from handling or shipping. Clean all preservative grease or coating from the propeller hub.

e. Check the pitch-change mechanism for free operation by turning the ring gear at the base of the propeller hub.

2. INSTALLATION.

a. CONTROL ASSEMBLY.

(1) The hand crank, 90-degree drive, a section of the control shaft extending to the fire wall, and its supporting bearing and bracket are already installed in the airplane. The balance of the control assembly will be furnished in a kit with the propeller.

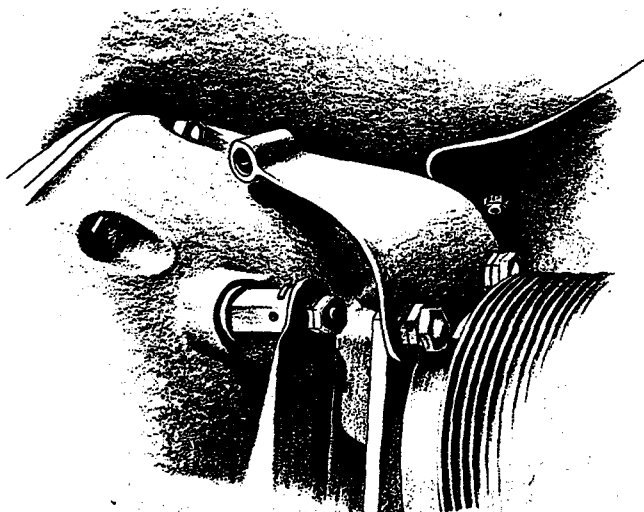


Figure 5—Installation Control Bearing Bracket

(2) Remove the engine cowling and the fixed-pitch propeller.

(3) Install the control bearing bracket, R002-210, on the two cylinder studs, as shown in figure 5.

(4) Remove the round snap button cover from the hole in the fire wall and slide the control shaft onto the shaft section installed in the airplane.

(5) Mark the rear shaft to indicate the depth it slides into the universal, remove both shaft sections from the airplane, fit them together. Then drill a No. 30 (.128) hole through the universal and shaft. The control crank and shaft can be removed by loosening the screw in the bracket holding the 90-degree drive and sliding it aft.

(6) Replace the shaft sections in the airplane and fasten them together with an AN392-21 flathead pin and safety with an AN380-21 cotter pin.

(7) Remove the two crankcase bolts located above and below the propeller shaft. (See figure 6.)

(8) Install the mounting bracket, using the two AN4-35 bolts supplied with the kit. Install a washer between each arm and the engine crankcase. (See figure 6.)

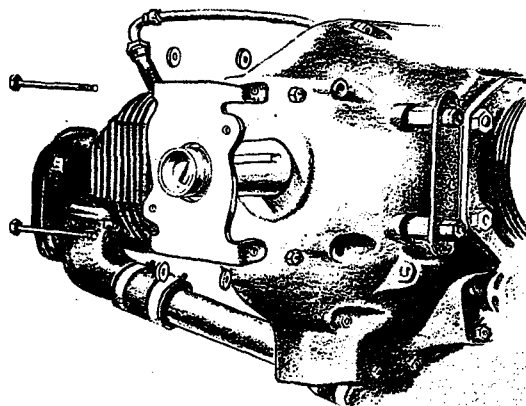


Figure 6—Pitch Control Mechanism Bracket

Note

The ground-off end of the mounting bracket goes to the top.

b. PROPELLER.

(1) Inspect propeller shaft for any nicks or burrs and if any are found, remove by polishing.

(2) Install the R000-333 propeller shaft key furnished with the kit and lubricate the shaft with engine oil.

(3) Place the propeller on the shaft and push it as far onto the shaft as it will go by hand.

Note

Be sure the key remains properly seated in the propeller keyway.

(4) Install propeller shaft nut, using bar and wrench to tighten. Tighten nut to 200 foot-pounds of torque—100-pounds pull on a 2-foot bar. (See figures 7 and 8.)

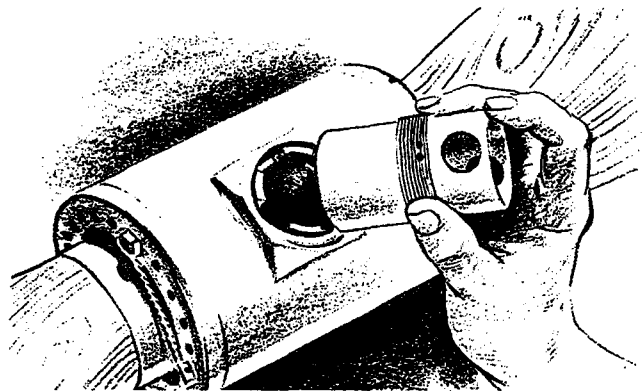


Figure 9—Inserting Shaft Lock Nut

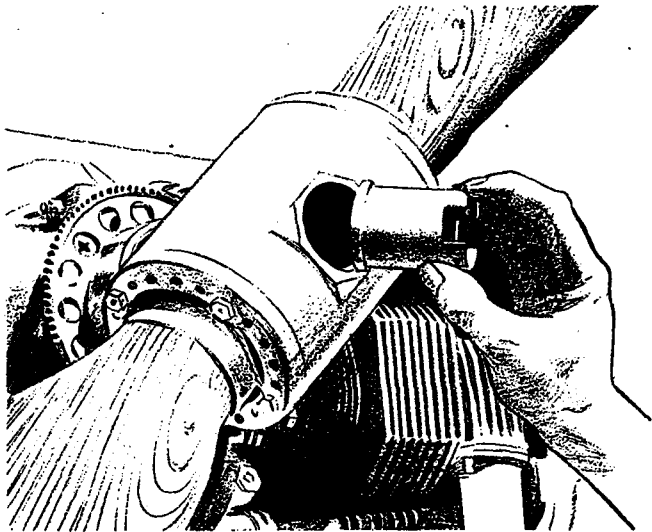


Figure 7—Inserting Shaft Nut

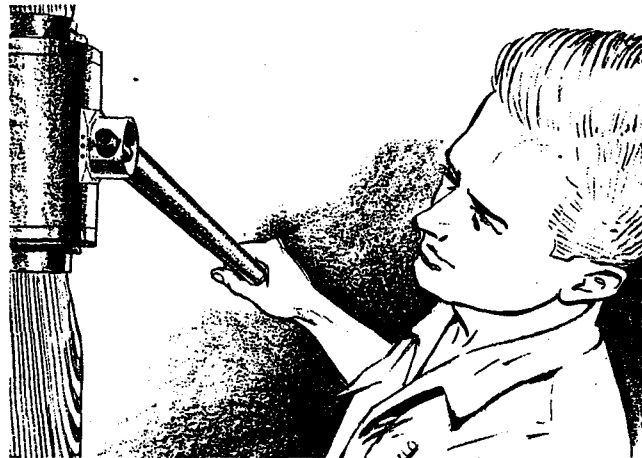


Figure 10—Tightening Shaft Lock Nut

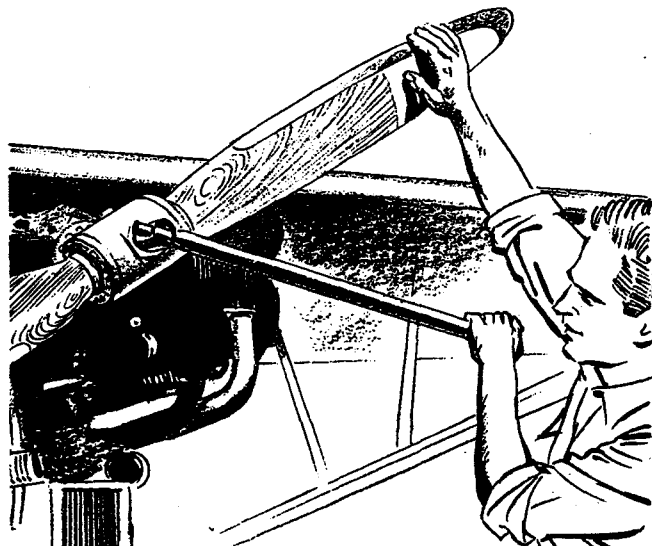


Figure 8—Tightening Shaft Nut

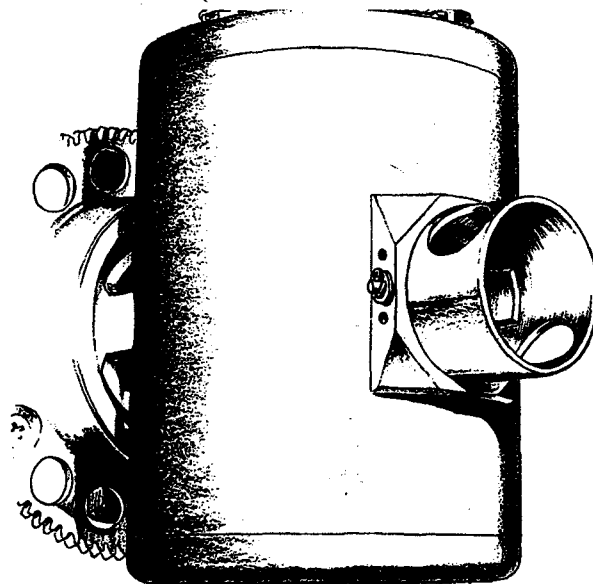


Figure 11—Safelying Lock Nut

(6) Turn the ring gear until the two inboard lightening holes line up with the holes in the pitch-change mechanism sleeve. Install the two R00-317 screws that hold the sleeve to the mounting bracket. Tighten bolts evenly so as not to cock or misalign gear mechanism. (See figure 12.)

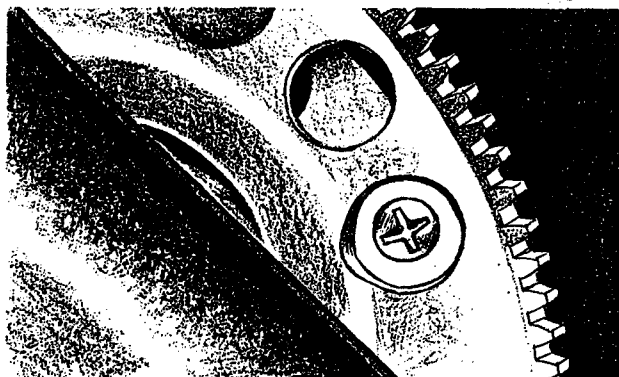


Figure 12—Installation Mounting Bracket Screws

Note

A clearance of 1/16 inch must be maintained between pitch-change mechanism and the propeller hub. This clearance is attained by using AN960-L416 or AN960-416 washers between the sleeve and mounting bracket. After final tightening of the attaching screws, recheck the clearance at 45-degree intervals for one complete revolution. If clearance is found satisfactory, safety the screws. (See figure 13.)

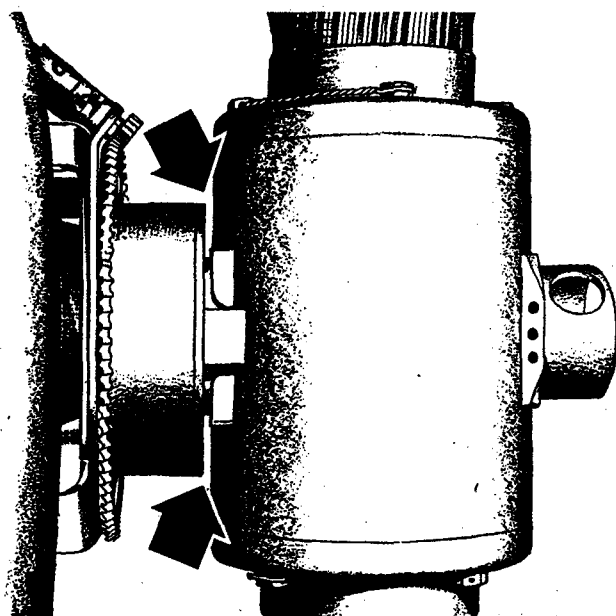


Figure 13—Hub, Pitch Mechanism Clearance Check

(7) Install the AN392-21 pin that connects the pinion gear universal to the control shaft and safety with a AN330-2-1 cotter pin. (See figure 14)

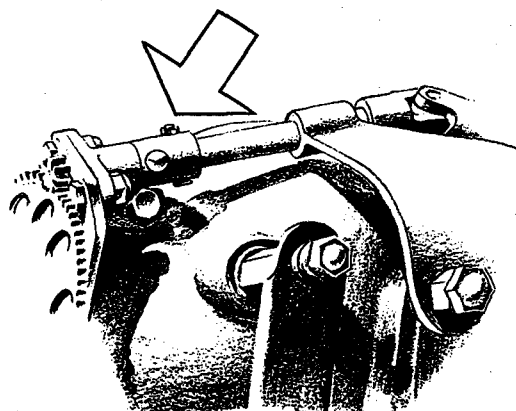


Figure 14—Pinion Gear, Shaft Connection

(8) Check the propeller for free operation of the pitch-change mechanism and control shaft by turning the hand crank. Ten revolutions of the hand crank will change the propeller pitch from low rpm to high rpm position. The pitch range is 7 1/2 degrees.

(9) Check the propeller for track. The blades should align within 1/16 inch of each other.

3. REMOVAL.

a. Disconnect the control shaft from the pinion gear universal.

b. Turn the pitch-change mechanism ring gear until the two inboard lightening holes line up with the attaching screws in the sleeve. Remove the two attaching screws.

c. Remove the lock pin from the propeller shaft lock nut.

d. Loosen the lock nut about two turns.

e. Using the propeller shaft nut wrench and a bar, loosen the propeller shaft nut. When the nut is backed out against the lock nut, it will act as a puller and will pull the propeller loose from the propeller shaft.

4. STORAGE ON AIRCRAFT.

When the airplane is not in use, turn the propeller to the horizontal position. If the propeller is exposed to the weather, protect it with a waterproof cover. Be sure the propeller is left in the low-pitch position. Coat the hub with engine oil.

5. PACKAGING FOR SHIPMENT.

a. Coat the hub with a corrosion preventive, such as Specification No. AN-C-52, type 1.

b. Place the propeller in the box and bolt in place.

c. Put loose parts of control assembly and propeller tools in a bag or box and fix them in place inside the box.

d. Spray the box with plastic sealer after painting on shipping information.

SECTION IV OPERATION

1. PRINCIPLES OF OPERATION.

a. The blade angles are changed by control arms which fit into slots in the base of the blade shanks. The control arms change the longitudinal motion of the actuator to co-axial motion. The actuator receives its motion from the worm inside the hub of the pitch-change mechanism ring gear. This gear is driven by pinion gear and shaft, which in turn is motivated by

the hand crank. Thus, depending on the direction of rotation of the hand crank, the angle of the blades is increased or decreased within the limits of the stops. (See figure 15.)

b. As this is a mechanically operated mechanism, the pitch of the propeller may be changed in flight or on the ground, with or without the engine running.

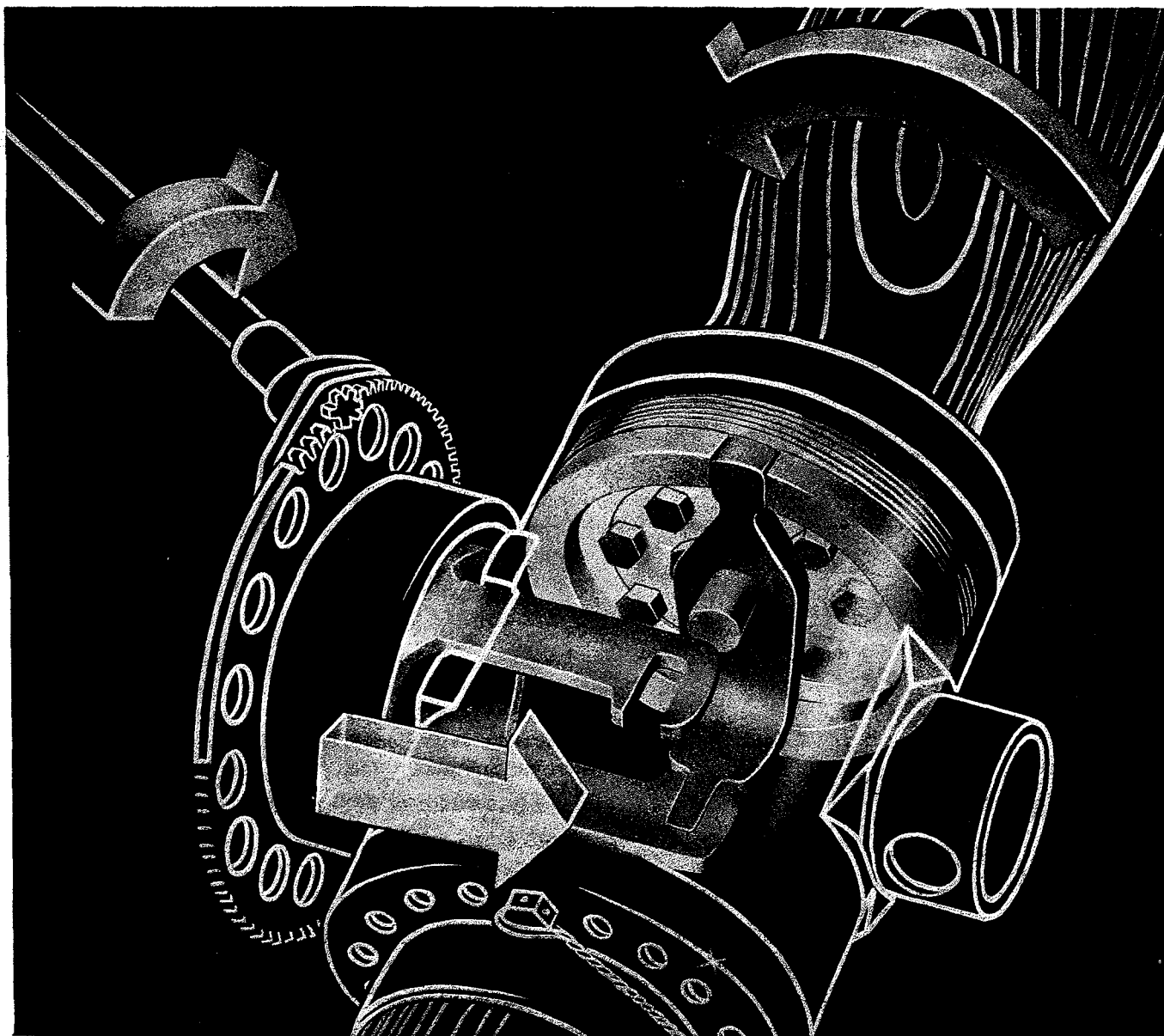


Figure 15—Principles of Operation Diagram

2. OPERATION INSTRUCTIONS.

a. GENERAL.

(1) The low-pitch position of this propeller is pre-set at the factory. A removable stop is set so that the engine will turn up its rated rpm on the ground. This gives the pilot the full rated horsepower of the engine for take-off. Removal of the low-pitch position stop will allow the engine to turn above rated rpm for critical performance.

(2) To increase the engine rpm, turn the hand crank counterclockwise. To decrease the rpm of the engine, turn the hand crank clockwise. (See figure 16.)

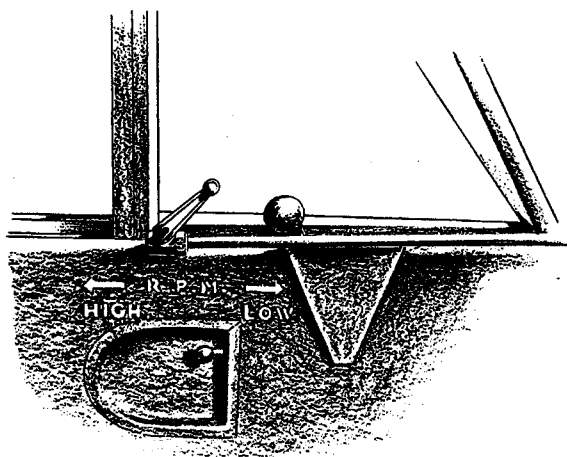


Figure 16—Pitch Change Handcrank

b. TAKE-OFF.—For take-off, the propeller is set for desired rpm by turning the hand crank counterclockwise. IMMEDIATELY AFTER TAKE-OFF, REDUCE THE RPM TO NORMAL CLIMB RPM OR NORMAL CRUISE RPM.

c. CLIMB.—For climbing, the desired engine rpm may be obtained by turning the hand crank counterclockwise to increase the engine rpm, thus making more horsepower available. If it is desired to reduce the engine rpm so as not to exceed the limits of the engine, turn the hand crank clockwise until the desired engine rpm is attained.

d. CRUISING.

(1) The low-rpm setting is the speed and economy position.

(2) The higher the pitch, the greater will be the forward motion with each revolution of the propeller. However, an increase in propeller pitch will also require an increase in power to maintain a given engine rpm. However, the desired indicated air speed may be maintained at a reduced engine rpm, as compared to the engine rpm of the airplane to maintain the same indicated air speed with a fixed-pitch propeller. By reducing the engine rpm, the fuel consumption and the engine wear will be reduced.

e. LANDING.—Approaches, landings, and all low-altitude glides should be made with the propeller in the low-pitch position.

CAUTION

The propeller should be in the high rpm position when the airplane is on the ground, as the engine will deliver its power more smoothly when taxiing. In addition, the actuator bearing is moved forward in this propeller position and acts as a seal to keep dust and dirt out of pitch-change mechanism worm gear.

Whenever possible, avoid opening the engine throttle when the airplane is standing or in motion on loose gravel, cinders, or mud. If this precaution is not observed, damage to the propeller may result, either by the propeller picking up particles or by their being thrown into the propeller by the wheels.

SECTION V

SERVICE INSPECTION, MAINTENANCE, AND LUBRICATION

1. SERVICE TOOLS REQUIRED.

Part No.	Nomenclature	Application
R000-33	Wrench — Propeller Thrust Bearing Spanner	To remove and replace blade.
R000-326	Wrench — Propeller Shaft Nut	To remove propeller shaft nut.
	Offset Screw Driver	To secure lock screw in retainer ring.

2. SERVICE INSPECTION.

Note

In accordance with Technical Order No. 00-20A-2, a summary of periodic inspections prescribed herein will be entered in the Master Airplane Maintenance Instruction Forms (maintained in the back of Form 41-B) for the airplane affected.

COLUMN NO. 28—PROPELLER AND ACCESSORIES.

Preflight Inspection

Visually check the propeller to determine whether there are any major or minor defects to prevent it from giving satisfactory and safe operation until next inspection. Check the pitch-change mechanism for proper operation by running the propeller from low to high pitch and then back to low pitch.

Note

On visual examination of some blades, fine dark edge joints will be quite noticeable on the blade surface. These prominent edge joints, or glue lines, in the wood are not defects and should not be regarded as such, unless the joints are open.

Daily Inspection

(The following instructions cover servicing of the propeller. The control shaft requires only the periodic inspection.)

Inspect the blades for damage or defects that may have occurred during previous operation. The inspection should include a careful check of the surfaces for damage such as cracks, dents, and nicks. The full length of the leading and trailing edges, as well as any dents or scars on the blade surface and the blade "tipping," should be carefully inspected for cracks. If any cracks in the blade are found, the blade should be replaced before flight.

50-Hour Inspection

Inspect the control bearing for dry or gummy appearance on the sleeve.

Check the clearance between the hub barrel and the pitch-change mechanism. This should be checked with the propeller in the horizontal and vertical positions. The correct clearance is 1/16 inch. (See figure 13.)

Check tipping for looseness, distortion, loose rivets, breaks, and cracks. Cracks that progress in straight lines and are approximately at right angles to the edge of the tipping are permitted, provided they do not cross through rivet holes. If the blade has any of these tipping defects, which impair its serviceability, it should be replaced.

Check the propeller blade for track. The blades should align within 1/16 inch of each other.

100-Hour Inspection

The 100-hour inspection is a repetition of 50-hour inspection with the addition of the inspection of the hub for grease leakage. If grease leakage is observed, it will be necessary to disassemble the propeller, repack with grease, and reassemble, as described in section VI.

600-Hour Inspection

The propeller is to be removed from the airplane and forwarded to an overhaul activity for overhaul.

3. MAINTENANCE.

a. Clean the propeller with soap and water; keep the hub coated with engine oil.

b. All places where the blade finish is worn thin, or is scratched, or nicked should be sanded to a feather edge with fine sandpaper. Then apply two coats of spar varnish, Specification No. AN-TT-V-116.

c. After varnish has dried overnight, polish propeller blade with a good grade of rubbing wax.

d. If control bearing sleeve becomes dry or gummy in appearance, apply a few drops of engine oil to the sleeve and run the propeller through its pitch range two or three times.

Note

When loose screws and rivets are found in the tipping, they should be tightened and resoldered. After tightening and resoldering, the propeller will require rebalancing, as described in section VII.

4. LUBRICATION.

The only lubrication required is at the 600-hour inspection. Use grease, Specification No. AN-G-4.

SECTION VI DISASSEMBLY, INSPECTION, REPAIR, AND REASSEMBLY

1. OVERHAUL TOOLS REQUIRED.

Part No.	Nomenclature	Application
R000-33	Wrench — Propeller Thrust Bearing Spanner	To remove and replace blade retainer ring.
R000-326	Wrench — Propeller Shaft Nut	To remove propeller shaft nut.
	Offset Screw Driver	To secure lock screw in retainer ring.
	Balance Mandrel for 0 Taper Shaft	To check balance.

2. DISASSEMBLY.

a. BLADES.

(1) Tape the propeller blades with masking tape for a distance of about 4 inches out from the shank, to protect the finish. (See figure 17.)



Figure 17

(2) Remove the four bolts that hold the balancing ring to the blade retainer ring. (See figure 18.)

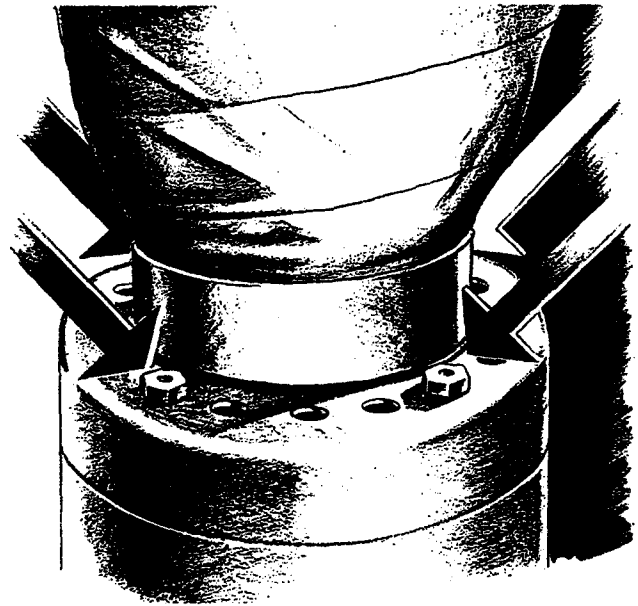


Figure 18

(3) Remove the screw that holds the retainer ring lock in place, and remove the retainer ring lock. (See figure 19.)

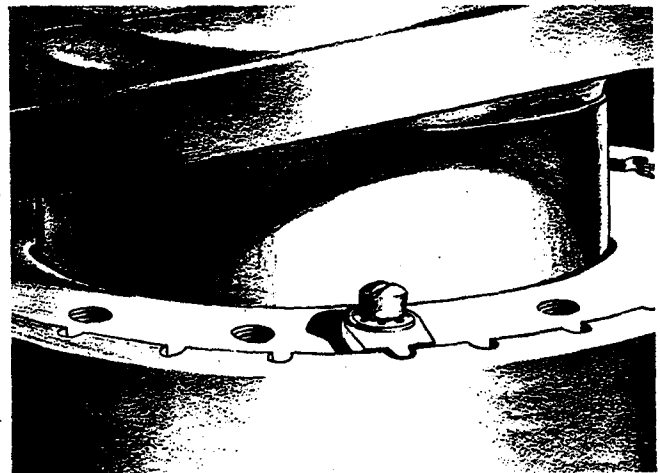


Figure 19

(4) Turn the blade retainer ring out of hub barrel with the R000-204 spanner wrench. (See figure 20.)

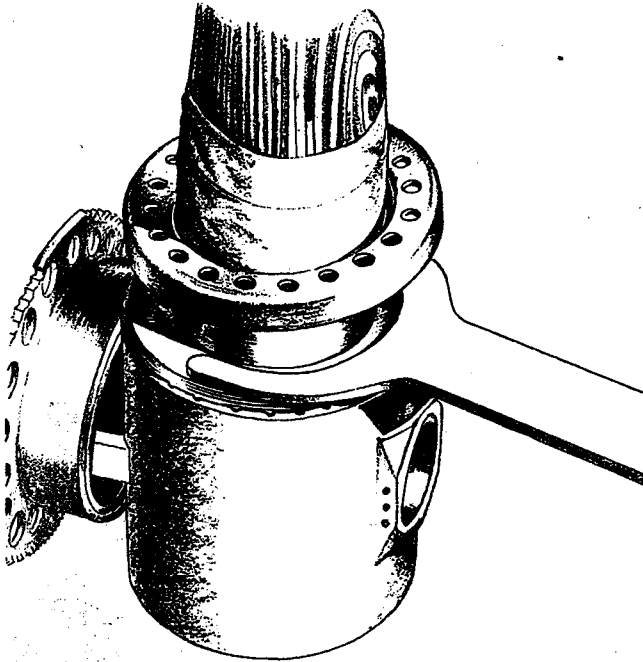


Figure 20

(5) Remove the blade from the hub barrel.

b. HUB.

(1) Remove the pitch-control arms from the hub barrels. (See figure 21.)

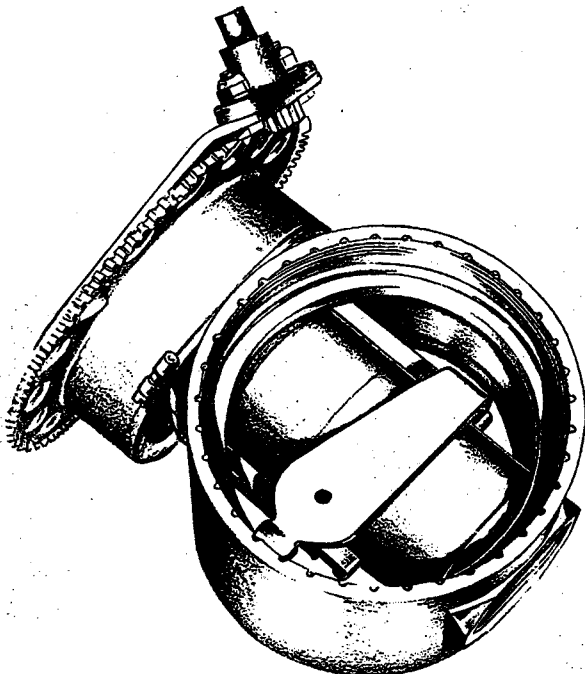


Figure 21

(2) Remove the pitch-change mechanism and actuator from the hub. (See figure 22.)

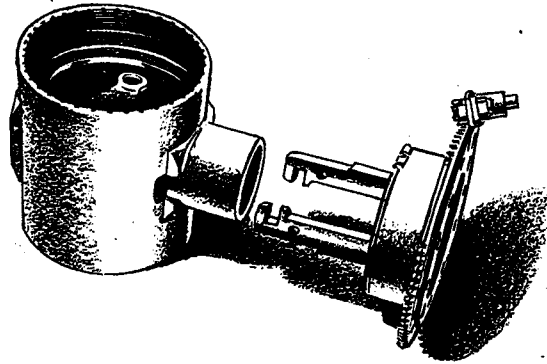


Figure 22

c. PITCH-CHANGE MECHANISM.

(1) Turn the pitch-change mechanism gear clockwise until the actuator is free, and remove actuator.

(2) Remove the machine screw from the pitch-change mechanism retainer ring, and remove the retainer ring.

(3) Slip the pitch-change mechanism gear off the pitch-change mechanism sleeve. (See figure 23.)

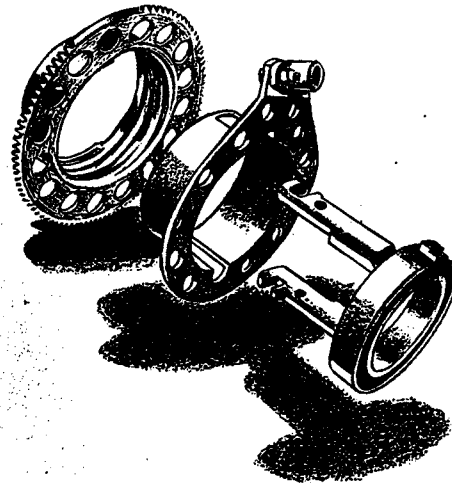


Figure 23

3. CLEANING, INSPECTION, AND REPAIR.

a. GENERAL.—After disassembly, all parts should be inspected according to the following outline, and necessary repair and replacements made. Before inspection, the parts should be cleaned and all metal parts oiled to prevent oxidation.

CAUTION

Do not use gasoline containing tetraethyl lead for cleaning.

b. HUB.

(1) The hub, the propeller shaft nut, the control arms, the actuator, the pitch-change mechanism gear, and the pitch-change mechanism sleeve should be inspected by magnafluxing. Replace all defective parts.

(2) Inspect the actuator bearing and the blade thrust bearings for wear and roughness.

Note

If the blade thrust bearing is worn or rough, the blade will have to be replaced, as the blade shank cannot be removed or replaced.

(3) Inspect the control arm for excessive wear and replace if required. (See figure 24.)

(4) Inspect the actuator for excessive wear on the lugs and in the slots. Replace if required.

(5) Inspect the pitch-change mechanism gear for excessively worn or bent teeth.

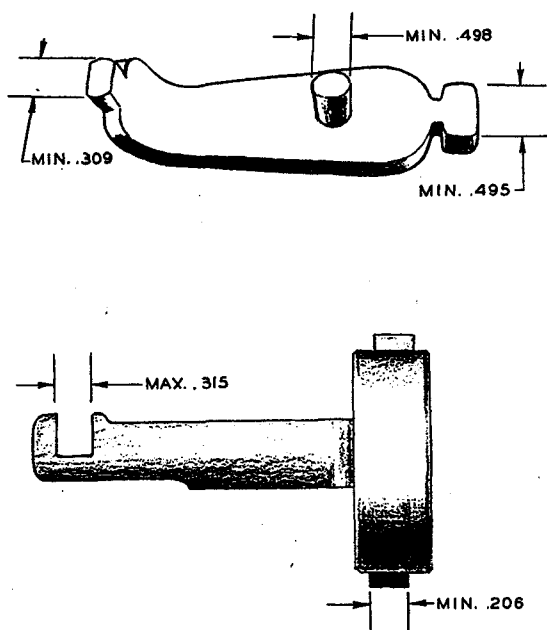


Figure 24

c. BLADES.

(1) Inspect the blade for glue failures. If found, the blade must be replaced.

(2) Inspect the tipping for looseness and for loose rivets and screws. When loose screws and rivets are found, they should be tightened and resoldered.

Note

After tightening the screws and rivets and resoldering, the propeller will require rebalancing, as described in section VII.

(3) Inspect the tip for cracks. Cracks which run at right angles to the tipping, but do not pass through

rivet holes, are acceptable.

(4) After a complete inspection of the blade, refinish with spar varnish and polish, Specification No. AN-TT-V-116.

d. CONTROL ASSEMBLY.

(1) Inspect pinion gear for worn and bent teeth.

(2) Inspect universal joints and connecting pins for excessive wear.

(3) Inspect control shafts and bearings for excessive wear.

4. REASSEMBLY.

a. PITCH-CHANGE MECHANISM.

(1) Slip the actuator into the pitch-change mechanism sleeve until the lugs are against the front of the slots. (See figure 25.)

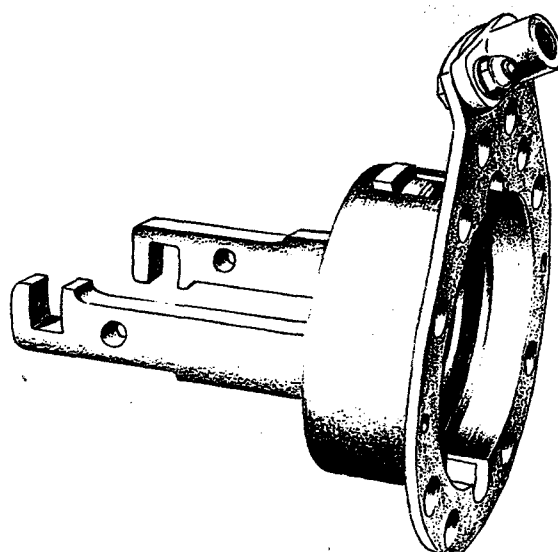


Figure 25

(2) Slip the pitch-change gear over the actuator arms with the blank section adjacent to the pinion gear bracket. Turn the gear clockwise onto the sleeve. The blank section of the gear should then be at the edge of the pinion gear bracket. (See figure 26.)

(3) Install the lock ring with the clamping screw at 90 degrees to the pinion gear. (See figure 27.)

b. HUB

(1) Install the pitch-change mechanism on the hub.

(2) Install the control arms into the hub barrel.

(3) Insert the blades into the hub barrel. Turn the retainer ring three or four turns. Check the blades to see if the control arm is in the slot in the blade shank. This can be done by turning the pitch-change gear. If the blades are in place, they will move when the gear is turned.

(4) With the spanner wrench, No. R000-331,

tighten the retainer ring until it is tight. Then back the retainer ring off just enough to free the blade for operation but not enough to result in a fore-and-aft movement of the blade. One slot for the lock is usually enough.

(5) Turn the retainer ring so the retainer ring lock will fit into the nearest groove.

(6) Install the retainer ring lock.

(7) Align the balance ring mark with the mark on the hub, install the four bolts, and safety.

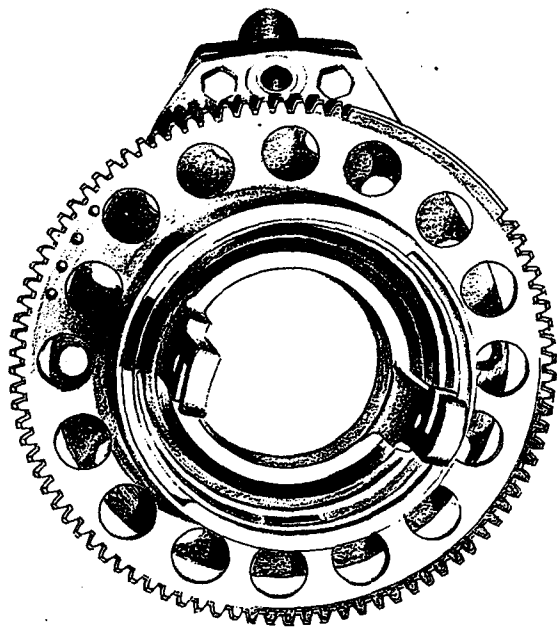


Figure 26

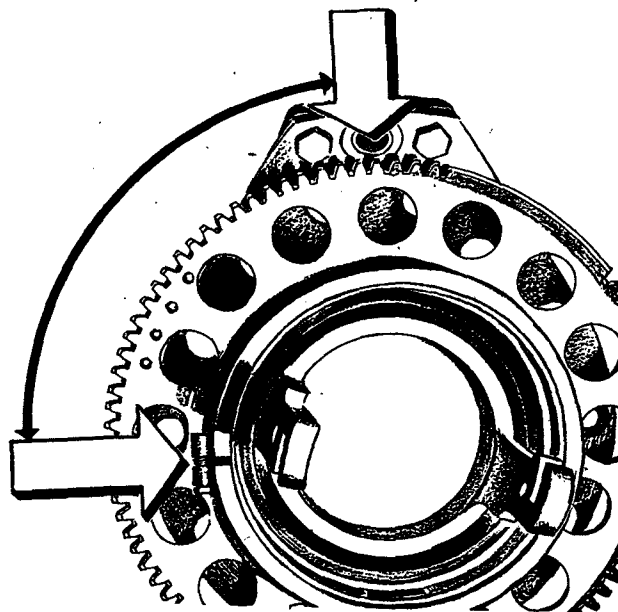


Figure 27

SECTION VII TEST PROCEDURE

1. STATIC BALANCING.

a. SPECIAL EQUIPMENT.

- (1) Mandrel for 0 taper shaft.
- (2) Knife-edge balance stand.

b. PREPARATION.

(1) To check the balance of the propeller, disassemble the propeller as described in section VI.

(2) Reassemble the propeller as described in section VI, omitting the following parts: the pitch-change mechanism gear, the sleeve assembly, and the ring assembly.

Note

These parts are stationary, they do not affect the balance of the propeller and the propeller cannot be balanced with these parts installed.

c. BALANCING.

(1) KNIFE-EDGE BALANCE.

(a) Mount the propeller on the balancing mandrel.

(b) Place propeller and mandrel on an approved knife-edge balance stand and test the balance with the propeller in the horizontal and vertical positions. When the propeller is correctly balanced, it will have no inclination to rotate when placed in either position.

(c) HORIZONTAL.—For a simple method of testing for satisfactory static balance, use, as a test weight, a piece of metal weighing approximately one-tenth of an ounce. (A U. S. copper penny is suggested, since it is about the proper weight.) This method eliminates the method of balancing the propeller to a standstill. With a small strip of adhesive or masking tape, attach the test weight to the blade 5 inches from the center of the hub. This weight should cause the blade on the side of the test weight to move down. The weight should be applied to both blades. If the test does not cause the propeller to move in the proper direction, the propeller is out of balance horizontally — sweat-solder evenly inside the balance ring on the light blade or apply a small amount of varnish, until the propeller comes to balance. If solder has been added to the heavy side, remove until balance is obtained. (See figure 28.)

(d) VERTICAL.—If the propeller is out of balance vertically, remove the bolts from the balance ring and rotate the ring so as to move the balance weight toward the light side until the propeller is balanced vertically. Replace bolts and safety.

(e) Mark the position of the balance rings.

(f) Remove the balance mandrel.

(g) Disassemble the propeller and reassemble as described in section VI.

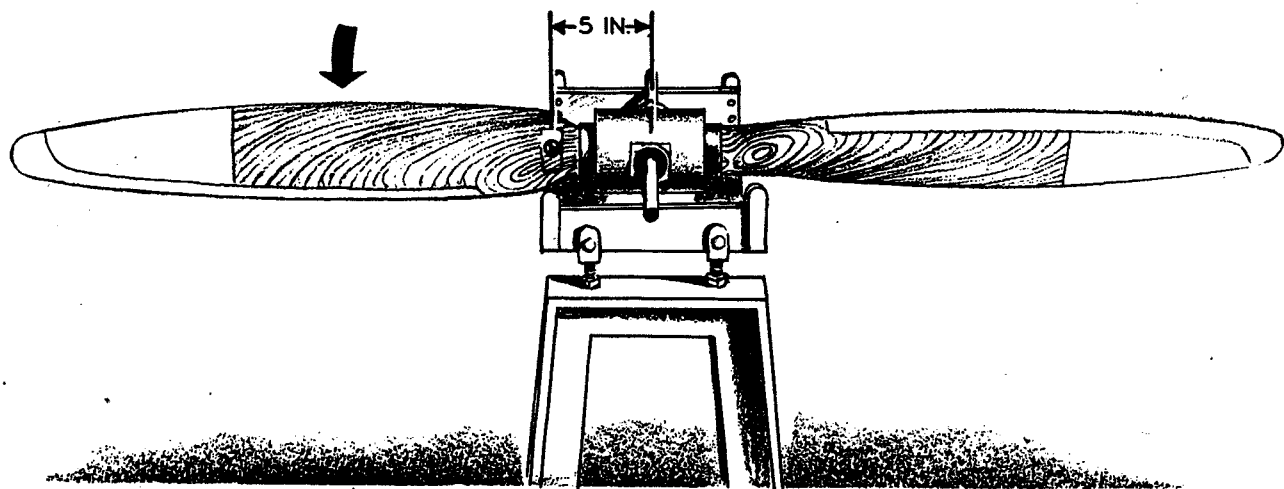


Figure 28—Horizontal Static Balance

SECTION VIII

PARTS CATALOG - INTRODUCTION

This catalog lists and illustrates all parts for the R002 Propeller. Parts and assemblies are listed in a Group Assembly Parts List with relationship of each sub-assembly or detail part to the major installation indicated by an indentation system. The major installation is listed in column 1 and assemblies, sub-assemblies and detail parts are listed in columns 2, 3, 4, 5 and 6 according to assembly sequence.

Parts may be identified when the description is known by consulting the illustrations to determine the correct figure and index numbers. Figure and index numbers are listed in consecutive order in col-

umns at the left hand side of the Group Assembly Parts List pages. When the figure and index numbers are located, the correct part number, nomenclature and quantity per assembly may be determined by reading from left to right across the page.

To find a part when only the part number is known, locate the number in the Part Number column of the Group Assembly Parts List. When the number is located, the correct nomenclature and quantity per assembly may be determined and from the figure and index numbers the illustration of the part may be located to obtain its description.

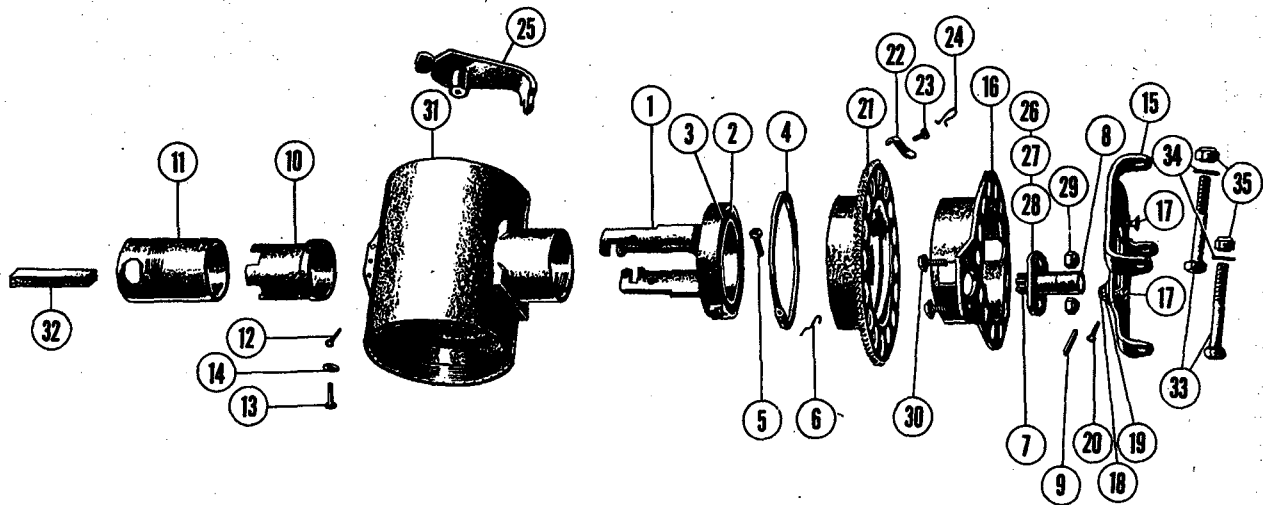


Figure 29—Hub Assembly

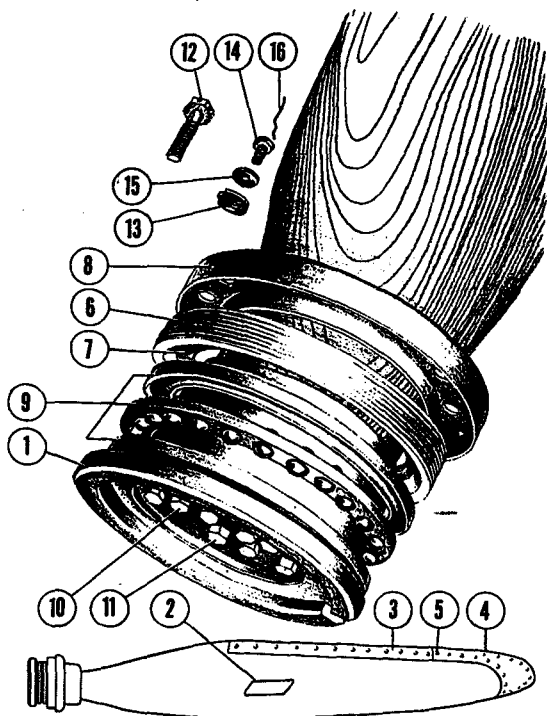


Figure 30—Blade Assembly—Propeller

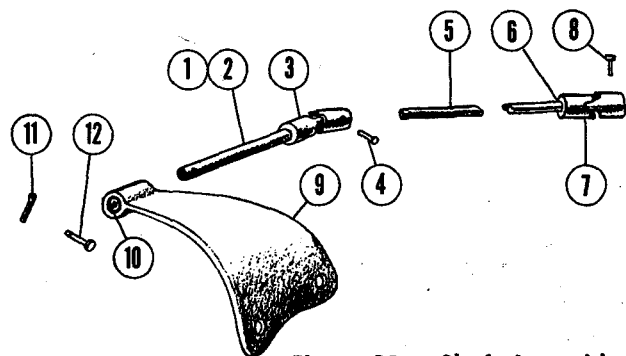


Figure 31—Shaft Assembly—
Left Hand

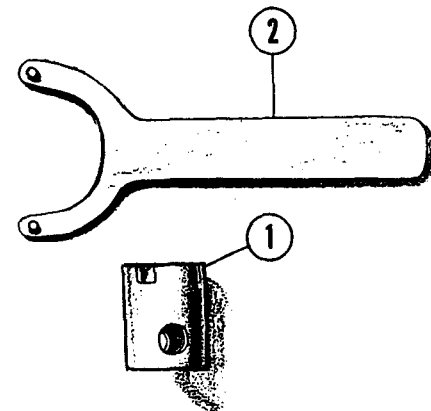


Figure 32—Propeller Tools

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Section IX—Group Assembly Parts List

FIG. NO.	INDEX NO.	STOCKED	GROUP AIRCRAFT ACCESSORY							UNITS PER ASSY	PROPERTY CLASSIFICATION		
			MAJOR ASSEMBLY INSTALLATION—PROPELLER								U.S. NAVY	U.S. ARMY	BRITISH
			PART NUMBER	1	2	3	4	5	6	NOMENCLATURE			
			R002-001						Installation—Propeller	1			
			R002-100						Propeller Assembly	1			
			R002-101						Hub Assembly	1			
29	1		R000-200						Bearing Assembly—Pitch control actuator	1			
29	2		R000-307						Seal—Pitch control bearing	2			
29	3		R000-308						Ring—Pitch control Bearing Snap	2			
29	4		R000-204						Ring Assembly—Pitch control lock	1			
29	5		AN500A-6-10						Screw	1			
29	6		995-32-2						Wire—Safety	1			
29	7		R000-304						Gear—Pitch control pinion	1			
29	8		R000-305						Adapter—Pitch control rod	1			
29	9		102809-A125-022						Pin	1			
29	10		R000-324						Nut—Propeller shaft	1			
29	11		R000-325						Nut—Propeller shaft lock	1			
29	12		AN380-2-1						Pin—Cotter	1			
29	13		AN392-13						Pin	1			
29	14		AN960-4						Washer	1			
29	15		R000-327-1						Bracket—Pitch control mechanism	1			
29	16		R001-201						Sleeve Assembly—Stationary pitch control	1			
29	17		AN510-416R8						Screw—Actuator assembly attaching	2			
29	18		AAF364-428						Nut	2			
29	19		AN960-516L						Washer	2			
29	20		AN380-2-2						Pin	2			
29	21		R001-202						Gear Assembly—Pitch control	1			
29	22		R002-320						Clip—Pitch limit	1			
29	23		AN502-6-2						Screw	1			
29	24		995-32-1						Wire—Safety	1			
29	25		R001-203						Arm Assembly—Pitch control	2			
29	26		R001-204						Bearing Assembly	1			
29	27		R001-306						Bearing—Pinion gear	1			
29	28		A-437-3						Bushing—Pinion gear	1			
29	29		AC365-1032						Nut	2			
29	30		AN3-5A						Bolt	2			
29	31		R002-208						Body Assembly—Hub	1			
29	32		R000-333						Key—Crankshaft	1			
29	33		AN4-36A						Bolt	2			
29	34		100951-S-095						Washer	2			
29	35		AC365-428						Nut	2			

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Section IX—Group Assembly Parts List

FIG. NO.	INDEX NO.	STOCKED	GROUP AIRCRAFT ACCESSORY						UNITS PER ASSY	PROPERTY CLASSIFICATION			
			MAJOR ASSEMBLY INSTALLATION—PROPELLER							U.S. NAVY	U.S. ARMY	BRITISH	
			PART NUMBER	1	2	3	4	5					6
30	1		R002-205						Blade Assembly—Propeller	2			
			R002-200						Retainer Assembly—Propeller blade	1			
30	2		R000-341						Placard—Beechcraft propeller	1			
30	3		R002-313						Strip—Leading edge	1			
30	4		R002-314						Tipping—Propeller blade metal	1			
30	5		AN531-4-8						Screw	28			
30	6		R002-302						Ring—Bearing retainer	1			
30	7		R002-303						Seal—Thrust bearing	1			
30	8		R002-308						Ring—Balance	1			
30	9		1515						Bearing (Fafnir Bearing Co., New Britain, Conn.)				
30	10		P6673R3						Screw— $\frac{1}{4}$ -8x5 (Parker-Kalon Corp., 200 Varick St., New York, New York)	7			
30	11		P6673R3						Screw— $\frac{1}{4}$ -8x5 $\frac{1}{2}$ (Parker-Kalon Corp., 200 Varick St., New York, New York)	5			
30	12		AN74-6						Bolt	4			
30	13		R002-309						Lock—Safety	1			
30	14		AN501-10-5						Screw	1			
30	15		AN936-A10						Washer	1			
30	16		995-32-8						Wire—Lock	1			
			R002-211						Shaft Assembly—Left hand	1			
31	1		R000-202-10						Tube Assembly—Pitch control	1			
31	2		R000-202-4						Tube	1			
31	3		R000-329						Universal—Pitch control shaft	1			
31	4		102809-A125-022						Pin	1			
31	5		R000-202-12						Tube Assembly—Pitch control	1			
31	6		R000-202-6						Tube	1			
31	7		R000-329						Universal—Pitch control shaft	1			
31	8		102809-A125-022						Pin	1			
31	9		R002-210						Bracket Assembly—Control	1			
31	10		A-521						Bearings—Oilite	1			
31	11		AN380-2-1						Pin—Cotter	3			
31	12		AN392-21						Pin	3			
31	13		R000-001						Installation—Miscellaneous tools and equipment	1			
32	1		R000-326						Wrench—Propeller shaft nut	1			
32	2		R000-331						Wrench—Propeller thrust bearing spanner	1			
Addendum													
The following list of parts are installed on the Piper L-4J airplane and may be procured from Piper. These parts are not illustrated in this catalogue other than in Figure 2 on page 2. They are the parts aft of the firewall.													
			M4185L						Crank and Adapter Assembly (Otto Aviation Corporation)				
			43101						Clamp Assembly—Pitch control adapter attaching				
			43081						Bracket Assembly—Pitch control tube mounting				