

CHAPTER XI

SERVICE INSPECTION

SAFETY PRECAUTIONS

1. When installing a new part, or reinstalling a part after it has been serviced, use new Tinnerman nuts and nuts of the self locking type, gaskets, hoses, safety wires, or cotter pins. Use new bolts and nuts in all cases when there is any doubt of their dependability.

Remember

THE PILOT DEPENDS ON YOU

LUBRICATION

2. For lubrication data, refer to Chapter II.

PREFLIGHT INSPECTION

3. Before entering the airplane, make a complete preflight inspection as outlined in the Owner's Operating Manual.

DAILY INSPECTION

4. Before the first flight of each day give the airplane as thorough a visual inspection as time permits. Inspect the airplane in accordance with the procedures outlined in the following paragraphs in addition to those inspections outlined in the preflight inspection.

5. Before entering the airplane, check the following items:

(a) *Propeller.* Inspect the screws that attach the propeller spinner to the hub to be sure that they are tight. Look for signs of cracking of the metal around the screws. If any radial cracks appear around the screws, drill at the ends of the cracks with a number 56 drill, or smaller, to stop the cracks from spreading. Inspect the metal blade tip to see that no rivets are working loose. Rap propeller with fist to see that it is tight. If spinner is not installed, check hub bolts.

(b) *Engine and Engine Compartment.* Examine the parts of the engine cowling that are fastened with screws, to ascertain that the screws are all in place and are tight. Inspect the hinged part of the cowling to be sure the trunk-type fasteners are in good condition. Inspect the inside and outside of the engine compartment to be sure

there are no fuel or oil leaks. Be certain that exhaust stacks and heater mufflers are securely fastened. Inspect the ignition cable terminals at both spark plug and magneto ends to ascertain that the cables are fastened properly and are not grounded.

(c) *Landing Gear.* Check the landing gear fairings for security of attachment. Remove grass or mud from the main gear and tail gear parts.

(d) *Top of Wing.* If the fuel tanks have been filled, be certain that the fuel tank caps are replaced and locked with the vent tubes pointing forward. Wipe off any fuel around the filler necks. Be sure that all access covers are fastened securely. Be certain that there are no rips or tears in the wing fabric. Clean the transparent plastic fairing over the landing lights in the left wing panel leading edge. (Refer to Chapter III, paragraph 2, for instructions concerning care of transparent plastic.) Remove ice, snow, or frost from the top of the wing.

(e) *Under Side of Wing.* Be certain that all access covers are in place and are securely fastened. Inspect the wing lift struts to see that there are no bends, dents, or cracks. Be sure that the screws that hold the strut fairings in place are tight.

(f) *Fuselage.* Be certain that there are no rips or tears in the fuselage fabric. Be sure that the metal cover sheet under the cabin floor is fastened securely. Check the cabin doors to ascertain that the doors are not dented or warped, that the doors open and close freely, and that the latches hold. Clean and polish the transparent plastic windows and windshield. (Refer to Chapter III, paragraph 2, for instructions concerning care of transparent plastic panels.)

(g) *Tail Surfaces.* Inspect the access covers under the stabilizer, on both sides of the fuselage, to be sure they are securely attached. Wipe mud or snow off the tail surfaces. Inspect for dents or cracks. Be sure that control surface hinge bolts are properly fastened. Ascertain that pivot bolts in control surface horns are properly fastened.

(h) *Radio Antenna.* Be certain that the radio antenna is securely fastened, and that the insulators are clean and free from cracks. If wires are dirty, wipe clean with a cloth.

WEEKLY, OR 25 FLYING HOURS INSPECTION

6. Once a week, or at the end of 25 flying hours, if that many hours are logged before a week is up, inspect the following items:

(a) *Propeller.* Inspect the propeller for general condition. Wash the blades with soap and water and rub them with a good polishing wax.

(b) *Engine.* Wash the exterior of the engine with kerosene or other grease solvent. Washing may be done by hand, but some type of pressure spray is preferable. Check the magneto points. The gap when opened should be not less than .017 inch. Check all high tension cables and terminals. If either the magneto terminal or the spark plug terminal of the cable is corroded, replace the cable. Be sure the cable insulation is in good condition. Inspect for signs of chafing on cable insulation.

(c) *Landing Gear and Brakes.* Remove the wheel fairings and inspect the wheels and brakes for general condition. Wash accumulated mud out of the inside of the wheel fairing. Check the brake hoses and couplings for signs of leaks.

(d) *Engine Controls in Cabin.* Operate all the engine controls to ascertain that they move freely through their full travel ranges. Check the primer pump and lines for leaks. Check the condition of grommets or seals around control linkages that go through the firewall.

(e) *Electrical System.* Test the battery with a hydrometer. The reading should be above 1.250. The battery should be recharged if the reading is below 1.250. Add distilled water to the battery solution if necessary. Clean and grease the battery terminals. Inspect the positive and ground leads and connections for general condition. Inspect the generator and starter cables and connections. Clean grease and dirt off the generator. Check the condition of the generator and starter mounting bolts, and inspect for oil leaks at the gaskets between the generator and starter flanges and the engine mounting pads.

(f) *Instruments.* Open pitot-static lines at left side of control panel to drain any accumulated water.

ONE-HUNDRED HOUR INSPECTION

7. Civil Air Regulations (Section 01.25) require that the airplane be given an annual inspection by a certified mechanic, or inspected every 100 hours of flight time if airplane is used for commercial flight operation. The registration certificate, the airworthiness certificate and the Airplane Flight Manual (Approved Operating Limitations), must be in the airplane when it is presented for inspection.

8. The following inspections do not include all the items covered in the Periodic Aircraft Inspection Report, Civil Aeronautics Authority

Form ACA 319 (as revised), but are listed here as an owner's guide to units that require particular attention at the 100-hour period:

(a) *Propeller*. Remove the propeller spinner and check the propeller hub bolts for tightness and proper safetying. The correct wrench torque load for the propeller hub bolts is 125 to 175 inch-pounds. Check the propeller track according to the instructions in Chapter VI, paragraph 4.

(b) *Engine*. Check the valve guides for wear. Press a screw driver against the side of each valve spring and watch for side play on the valve stem in the guide. The valves cannot seat properly if there is excessive clearance at the guides. Replace exhaust valve guides that show evidence of exhaust gases escaping around the valve stem. Replace any intake valve guide if the head of the valve shows evidence of not seating evenly. Check the clearance between the valve rocker arm tip and the valve stem end according to instructions in Chapter VI, paragraph 30. Remove the carburetor and clean it thoroughly.

CAUTION

Clean the carburetor jets with compressed air. Do not clean the jets with a wire.

Remove the spark plugs and clean them thoroughly. Check the engine accessory bolts. Check the engine cooling baffle box for cracks at the attachment screw heads. Check the upper cylinder baffles for cracks. Check the engine controls for general condition and proper functioning. Check the engine mount bolts for tightness and proper safetying.

(c) *Fuel System*. Make a thorough inspection of the fuel lines from the tanks to the carburetor. Drain a small amount of fuel from the plug in the bottom of each fuel tank to get rid of water and accumulated sediment. Examine the selector valve carefully for signs of leaks. Turn the selector valve from right to left tank with the strainer drain cock open to check the flow of fuel through the lines and the selector valve. Clean the fuel strainers. There is one screen type strainer at each tank outlet, one filter type strainer on the left side of the firewall, and a tube type screen strainer in the top of the carburetor body casting, where the fuel hose joins the carburetor.

(d) *Oil Cooler*. Check the lines from the oil cooler to the engine for signs of leaks. Blow compressed air through the core to clean obstructions out of the core cells.

(e) *Air Filter.* Remove the air filter from the bottom cowling and clean it according to instructions in Chapter VI, paragraph 40.

(f) *Cabin and Carburetor Air Heat System.* Make a careful inspection of the exhaust pipe and the heater muff on the engine to be sure there are no cracks or leaks that will allow exhaust gases to enter the cabin or the carburetor. See that the hot air valve gate is closed tight when the cabin heat control is in the *off* position. If air intake duct is left off airplane, also take off heater muff.

(g) *Firewall.* Inspect all grommets and seals where wiring and controls pass through the firewall to be certain that there are no places where exhaust gases can leak into the cabin.

(h) *Engine Compartment Final Check.* Make a final thorough inspection of all wires, hoses, and controls. Be certain that there is no possibility of insulated wires, hoses, or other inflammable material coming in contact with hot parts of the engine or the exhaust system. Be sure that there is no binding or chafing of control arms or levers against wires or engine parts or accessories. Be certain that all metal tubing is looped and supported in such a way that vibration stresses will be minimized. Be sure that insulated wires do not rest on metal parts in such a way that vibration can cause the insulation to wear through and cause a short circuit.

(i) *Cabin.* Renew any instrument or control markings that have worn off or become indistinct. Remove the seats and clean all places that are not easy to clean every day or every week. Repeat the 25-hour battery check while the seats are out. See that vents are not stopped up and that the battery compartment is clean. Repair or replace badly scratched or crazed transparent panels. Inspect the seats, safety belts, ventilators, cabin doors, and carburetor and cabin heat controls to be sure they are in good order. Be sure that all records and log books are up to date. While in the cabin, check the parking brake mechanism. Service the brake master cylinders according to instructions in Chapter II, paragraph 13. Remove the shock absorber cover and add fluid to the landing gear shock struts according to instructions in Chapter II, paragraph 19. Check the landing gear strut attaching bolts. Check the shock struts for signs of leaks.

(j) *Radio.* After all engine and cabin interior inspections are completed and necessary work is done, test the radio while the engine is running to ascertain that the transmitter and receiver operate properly.

CAUTION

Transmitter check should be made only when control tower frequency is clear. Be brief, transmit only messages essential to safety of life and property in the air. (See Sections 9.62 and 9.91 of Federal Communications Commission's Rules and Regulations.)

(k) *Landing Gear.* Jack the airplane at the main wheels (refer to Chapter II for jacking instructions). Remove the wheels and inspect the brakes without disassembling the brake unit. Inspect for any corrosion or broken parts. Check the clearance between the brake linings and the rotating disc. Refer to Chapter V for proper method of adjusting the brake clearances. Inspect the brakes for evidence of seal leaks. Use compressed air to blow particles of dirt and brake lining dust from around the brake housing and the disc. Inspect for the condition of nuts, bolts, and safety wire. Remove grease and oil. Pack the wheel bearings in accordance with instructions in Chapter II. Remove the upper landing gear fairings and the access cover sheet from the bottom of the fuselage. Lubricate the landing gear hinges. Refer to the lubrication chart, figure 15, Chapter II. Check the condition of the wheels. If the protective coating is chipped off or worn through at any place, touch up with aluminum lacquer to prevent corrosion. A recommended formula for aluminum lacquer is 12 ounces of aluminum paste to one gallon of clear dope. Remove the tires and reverse them on the rims so that the worn half of the tread is inboard. Inspect the tail wheel spring and steering swivel for general condition. Lubricate as indicated on the Lubrication Chart, figure 17, Chapter II.

(l) *Fuselage.* Clean the under side of the fuselage. Mend any rips or tears in the fabric according to instructions in Chapter III. Look for signs of rust, corrosion, bends, dents, or other damage to the structure. Be certain that protective coating on the structure is not chipped off or worn through at any place.

(m) *Wing.* Inspect for bends or dents in the wing struts. Be certain that the wing attachment fittings are in good condition and that the bolts are properly fastened. Check for loose drag wires. Remove the strut fairings and ascertain that the strut fittings and attaching bolts are in good condition. Inspect the wing fabric and mend any rips or tears. Be sure that position lights and landing lights are

mounted securely and are in good condition. Clean the top of the wing and restore the sheen with polishing wax.

n. *Ailerons and Flaps.* Inspect hinges and push-pull tubes for bends, cracks, or signs of wear. Inspect the aileron, and flap surfaces to ascertain that there are no wrinkles, bends, dents, or other signs of damage.

o. *Tail Surfaces.* Inspect hinges and push-pull tubes for bends, cracks or signs of wear. Inspect the fin, rudder, stabilizer, and elevator for bends, dents, or cracks. If any protective coating is chipped or worn off, restore it with colored lacquer to match the rest of the surface. Be certain that the tail light is in good condition. Check stabilizer leading edge attachment fittings for cracks.

(p) *Surface Controls.* Refer to Chapter IV for control cables rigging data. Inspect for frayed cables and signs of chafing against parts of fuselage, wing, or tail structures.

MAJOR OVERHAUL PERIOD

10. At the time the engine is disassembled for complete overhaul, give the airplane a thorough inspection because the airplane will be out of service long enough to allow time for removal of parts and coverings that are not generally removed during the routine inspection periods. The number of hours of flying time between major overhauls is not prescribed by either the Civil Air Regulations or the engine manufacturer. A top overhaul after 300 to 400 hours flying time may be required depending on the conditions of operation. A major overhaul after completion of 600 to 750 hours flying time will be required.

SPECIAL INSPECTIONS

11. Certain items may require attention at times that may not coincide with routine inspection periods. Among such items are the following:

(a) *Engine Oil.* The frequency with which the engine oil is changed depends upon operating conditions. When operating from dusty fields, it may be necessary to change the engine oil every 25 hours of operation, or oftener. Under more favorable conditions, the engine oil may be used for 100 hours without changing. Refer to Chapter II for information on the proper grade of oil to use under various weather conditions. It is recommended the oil drained out of

the crankcase be strained through a 20-mesh screen or finer before it is discarded, to make certain no metal particles are present. Metal particles are usually present in oil drained from a new engine, but this does not indicate wear of engine parts. If metal particles are found in oil drained from an engine that has been in service for some time, however, wear of parts should be suspected and the engine should be checked to determine the cause.

(b) *Propeller*. Whenever a propeller is installed, the propeller track should be checked, to ascertain that all the hub bolts have been tightened evenly. Instructions for checking the propeller track are given in Chapter VI.

(c) *Brakes*. Disassemble and inspect the brakes every 400 hours. Remove, disassemble, and inspect the master cylinders on the brake pedals. Install new packings and seals.

(d) *Engine Vibration Absorbers*. Renew the engine rubber vibration absorbers whenever it is evident that they are not performing the function of absorbing engine vibration. Life of the vibration absorbers will be prolonged if the engine mounting bolts are not drawn too tight when the engine is installed. The engine bolts should not be drawn so tight that the engine cannot be moved slightly by hand pressure.

(e) *Compass*. Compensate the compass every four months. Instructions for compensating the compass are given in Chapter IX.

(f) *Wing Drag Wires*. If major repair work is done on a wing panel that necessitates removal of a large amount of fabric, inspect the drag wires before replacing the fabric. Check the tensions of the drag wires and be certain that the tensions are as indicated in figure 21.