Post-Paint>Fuselage>Engine>Fit Jabiru wood propeller and spinner

Objectives of this task:

In this task the propeller will be fitted to the engine and the spinner will be mounted.
The propeller must be fitted before the engine can be rotated or run.

This task covers the fitting of either the Jabiru or Sensenich propeller.

The cylinder compression can cause the propeller to move unexpectedly when rotating the engine and so for safety reasons all spark plugs should be removed and set aside and the spark plug holes should be covered with a clean cloth during this task.

Materials and equipment required:

Spinner Hardware pack, Torque Seal inspection putty, small torque wrench

Fit the propeller

Sand both sides of each spinner mounting plate flat in the flange/propeller mounting area.



Turn the engine so that one set of flywheel magnets are at the top (circled above left). This will ensure that the propeller will stop in a horizontal position. Fit the guide bushes from the back of the propeller flange and fit the rear spinner mounting plate over them with the cupped face towards the rear. Fit the propeller so that the upper blade is closest to the 11 o'clock position when viewed from the front of the engine. Tap the bolts through with a soft hammer.



Fit the front spinner mounting plate with the cupped face towards the front, followed by the machined aluminium mounting plate.

On each bolt place pairs of Belleville washers in a 'cup to cup' arrangement: **( ) ( )** (Jabiru prop: 4 pairs, Sensenich prop: 3 pairs) followed by a single flat washer and a Nyloc nut. Tighten the nuts until they are just firm and then torque each nut (Jabiru: 7 ft/lbs or 9.5 Nm, Sensenich: 12ft/lbs or 16.25 Nm) working in a diagonal or criss-cross pattern.

There must be more than 1½ and less that 3 threads showing. Pack behind the Nyloc nuts with flat washers as required in order to achieve this. Recheck the torque settings, applying a slow, steady pressure on the torque wrench until the correct torque value is reached.

Add engine oil

At this time the engine should have oil of the recommended grade and quantity added – refer to the engine manual for specific detail. Pour slowly to minimize the chance of spillage and refit the dipstick. Remove the "Do Not Run: Contains No Oil" tag from the engine.

Check and set the propeller blade tracking

It is important that the tips of both propeller blades track *exactly* in line with each other as the propeller rotates – tracking must be adjusted to very close tolerances, preferably less than 0.25mm, in order to minimize engine and/or airframe vibration.

To check the tracking you will need to make up an adjustable pointer (example shown arrowed at right) that can be clamped to the nose gear and placed against the tip of the propeller blade as a reference point (shown circled at right).

Rotate the propeller and check that each tip is just touching the pointer. If there is any variation then the technique to be used is as follows:

Coarse adjustment: if the difference between blades is greater than 1 to 1.5mm then a shim will need to be made and placed between the propeller and the propeller flange.

Remove the propeller. Cut a shim from a sheet of standard 80gsm paper (photocopier paper) as shown at right (use the discarded universal propeller flange as a pattern) and fit on the propeller flange on the side of rearmost blade.

Re-fit the propeller and re-torque all the nuts to the correct values, working in a diagonal or criss-cross pattern, and check the tracking.

Add more shims if required. Note that a shim cut from a manila folder will correct a 2.5-3mm tracking error. Make fine adjustments as described next:

Fine adjustment: if the variation between blades is 1mm or less then apply additional torque of no more than 2 ft/lbs to the 3 nuts on the side of the front-most blade and check the tracking.

When the blade tracking is less than 0.25mm, loosen off all of the nuts and then re-torque them all to the correct values, working in a diagonal or criss-cross pattern.

When blade tracking is correct and all the nuts have been set to correct torque, apply a dab of Torque Seal inspection putty to the top of each nut as shown at right. This gives a clear visual indication that no further work is required.

Pre-fit the spinner

Test fit the spinner – it can be fitted in 2 positions, so try it each way and use the position where the holes all line up the best while giving an even gap around the base of the propeller.

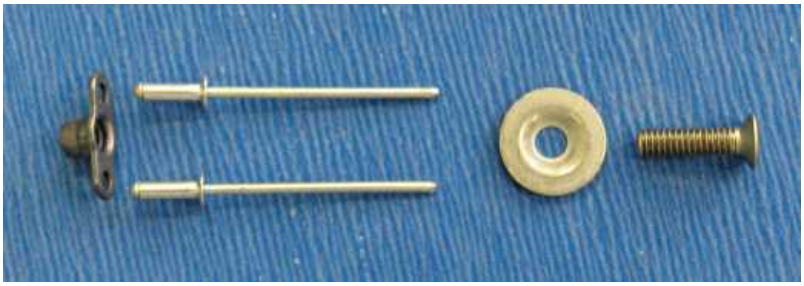
When the mounting position has been decided, mark each component with a permanent marker as shown above so that if there is any need to remove the spinner or propeller all the parts can be refitted in the same position relative to each other.

Fit the spinner in place and line it up with the back of the rear mounting plate and then push a 5/32” pop rivet though all of the holes that line up. Working on one remaining hole at a time, drill a 5/32” hole through the spinner and the rear mounting plate and temporarily place a 5/32” pop rivet in each hole to keep the spinner and the mounting plate in alignment.

Work your way around all 6 holes in this manner. Repeat the process for the 6 holes in the front mounting plate. The spinner should resemble a porcupine at this stage, with pop rivets protruding from the 12 mounting holes. Remove the pop rivets and the spinner and drill all the holes in the spinner out to 3/16” to provide clearance for the screw threads.

Countersink each hole so that the Tinneman washers will sit flush against the spinner.

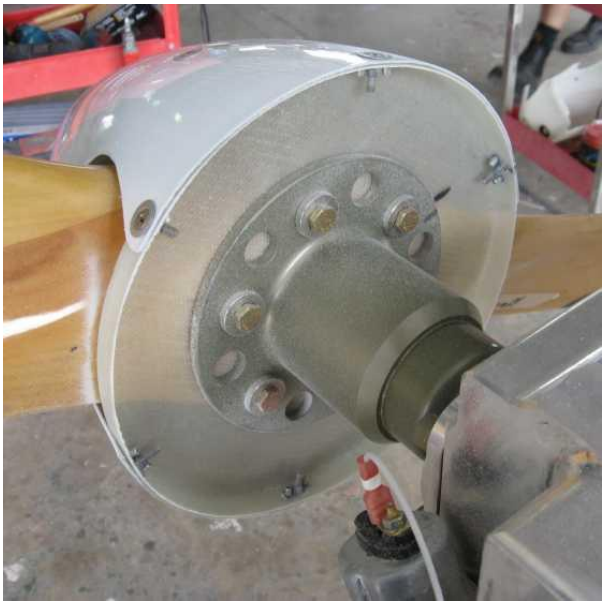
Fit the captive nuts to the inside of the spinner mounting plates - use the captive nut itself (a complete captive nut assembly is shown below left) as a jig (below right) to drill the rivet holes– thread the screw part way through the captive nut from the back and fit the exposed end of the thread into the hole, then drill the 2 x 3/32” rivet holes.



Countersink the rivet holes just enough to make a countersunk 3/32” rivet sit flush and fix the captive nuts in place and then enlarge the 5/32” holes in the mounting plates to 3/16” to provide clearance for the screw threads.

Fit the spinner

Fit the spinner using 5/32” countersunk screws and Tinneman washers.



Use a long sanding block to sand the rear mounting plate flush with the rear of the spinner.

Refit the spark plugs – refer to the engine manual for the torque settings.

This completes the *Post-Paint>Fuselage>Engine>Fit Jabiru wood propeller and spinner* task.