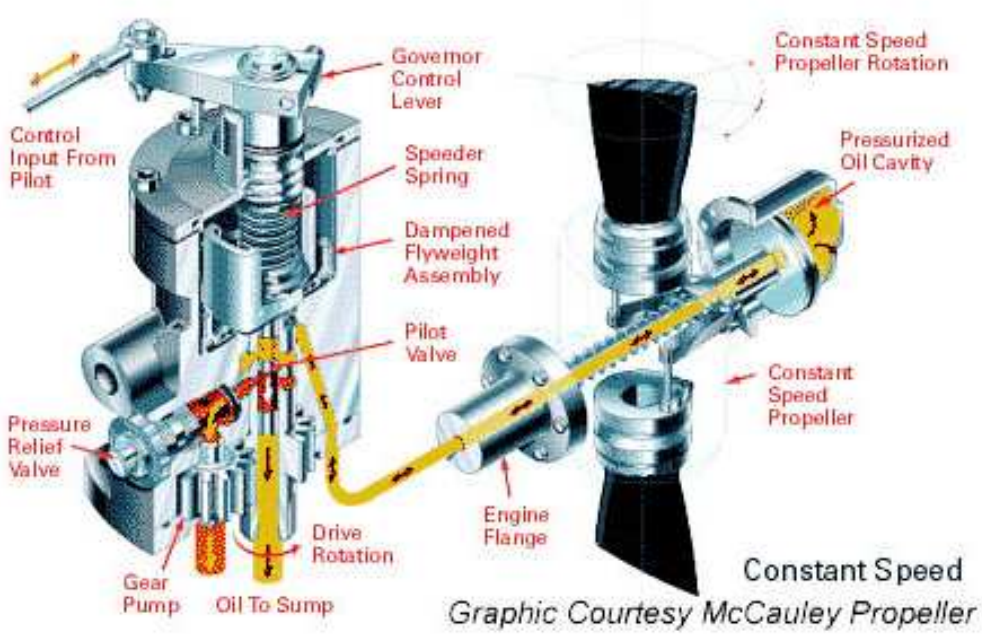


Graphic Courtesy McCauley Propeller

Constant Speed, Counterweight Propellers

The Counterweight type propeller may be used to operate either as a controllable or constant speed propeller. The hydraulic counterweight propeller consists of a hub assembly, blade assembly, cylinder assembly, and counterweight assembly.

The counterweight assembly on the propeller is attached to the blades and moves with them. The centrifugal forces obtained from rotating counterweights move the blades to high angle setting. The centrifugal force of the counterweight assembly is depended on the rotational speed of the propellers r.p.m. The propeller blades have a definite range of angular motion by an adjusting for high and low angle on the counterweight brackets.

Controllable : the operator will select either low blade angle or high blade angle by two-way valve which permits engine oil to flow into or drain from the propeller.

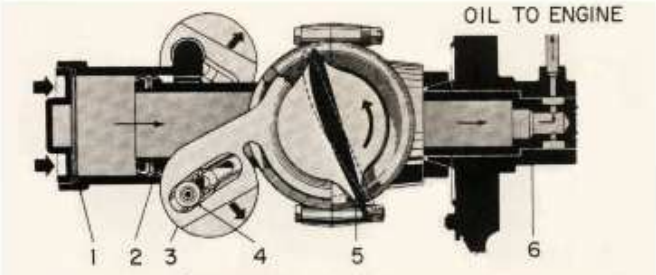
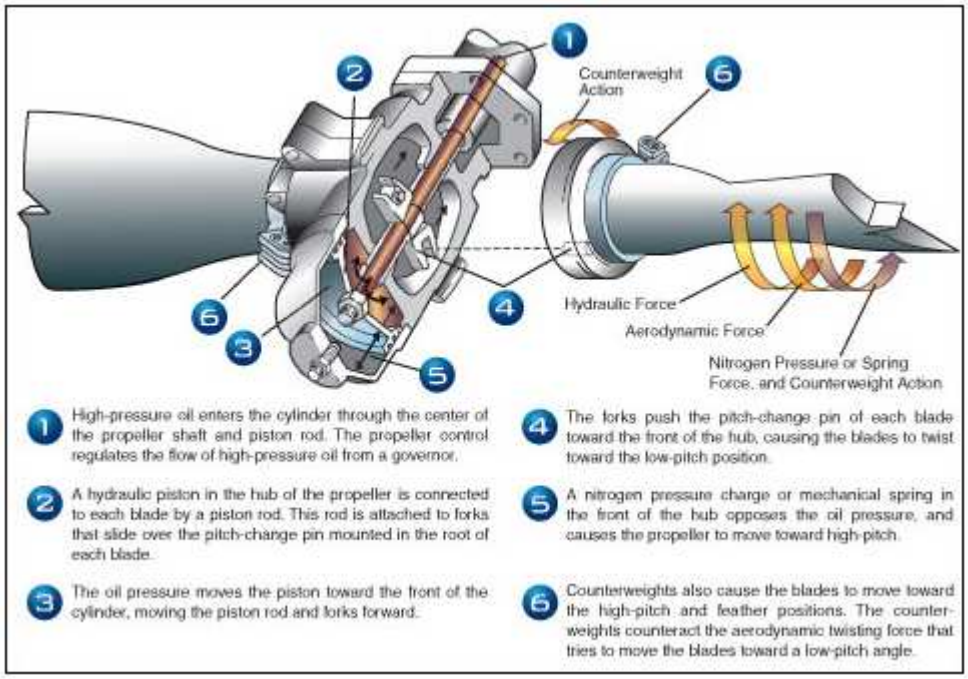


Diagram of Controllable Two Position Pitch Mechanism

(1) Propeller cylinder, (2) propeller piston, (3) propeller counterweight and bracket, (4) propeller counterweight shaft and bearing, (5) propeller blade, (6) engine propeller shaft.

Constant Speed : If an engine driven **governor** is used, the propeller will operate as a constant speed. The propeller and engine speed will be maintained constant at any r.p.m. setting within the operating range of the propeller.



1) Normal pressure oil, which is what the engine's "main" oil pump supplies, and is what you read on the oil pressure gauge.
2) High pressure oil, which is what the governor supplies to the propeller by means of a small internal boost pump. Most people aren't aware that this boost pump even exists. The propeller is actuated by this high pressure oil, not the engine's main oil pump.

The engine's main oil pump draws oil from the sump and supplies it to the prop governor at normal engine oil pressure. The prop governor then uses its small boost pump to boost the pressure to 180-300psi. This high-pressure oil flows through the governor's pilot valve, then through an oil transfer system, and on through the hollow crankshaft into the propeller.

If you have a loss of engine oil pressure, the governor's boost pump will no longer have its supply of oil and will be unable to maintain the pressure the prop needs to maintain a fine pitch. The prop will start moving towards feather, but won't quite make it there yet because there is still some residual pressure trapped in the oil transfer system between the propeller and the pilot valve. At this point, two things can happen:

A) If there are any small leaks in the oil transfer system (and there probably are) then the pressure will gradually bleed off and there will be nothing left to oppose the nitrogen/spring pressure, so the prop will very slowly feather on its own. This will probably take more time to bleed off than you have, so most people will choose option B...

B) ...which means they will pull the prop lever back to the feather position. This mechanically opens the pilot valve and vents off all the residual high-pressure oil, allowing the propeller to snap immediately to the feather position.

Unfeathering accumulators are connected in the oil path between the pilot valve and the propeller. The accumulator is charged with oil during normal operation by the boost pump. When the prop lever is moved out of feather, it seats the pilot valve and opens the valve from the accumulator, allowing the stored oil to partially repressurize that path enough to take it out of feather.