aircraft systems also have an oil quantity indicating system that shows the quantity of oil during flight. One type system consists essentially of an arm and float mechanism that rides the level of the oil and actuates an electric transmitter on top of the tank. The transmitter is connected to a cockpit gauge that indicates the quantity of oil.

Oil Pump

Oil entering the engine is pressurized, filtered, and regulated by units within the engine. They are discussed along with the external oil system to provide a concept of the complete oil system.

As oil enters the engine, it is pressurized by a gear-type pump. *[Figure 6-6]* This pump is a positive displacement pump that consists of two meshed gears that revolve inside the housing. The clearance between the teeth and housing is small. The pump inlet is located on the left and the discharge port is connected to the engine's system pressure line. One gear is attached to a splined drive shaft that extends from the pump housing to an accessory drive shaft on the engine. Seals are used to prevent leakage around the drive shaft. As the lower gear is rotated counterclockwise, the driven idler gear turns clockwise.

As oil enters the gear chamber, it is picked up by the gear teeth, trapped between them and the sides of the gear chamber, is carried around the outside of the gears, and discharged from the pressure port into the oil screen passage. The pressurized oil flows to the oil filter, where any solid particles suspended in the oil are separated from it, preventing possible damage to moving parts of the engine.

Oil under pressure then opens the oil filter check valve mounted in the top of the filter. This valve is used mostly with dry sump radial engines and is closed by a light spring loading of 1 to 3 pounds per square inch (psi) when the engine is not operating to prevent gravity-fed oil from entering the engine and settling in the lower cylinders or sump area of the engine. If oil were allowed to gradually seep by the rings of the piston and fill the combustion chamber, it could cause a liquid lock. This could happen if the valves on the cylinder were both closed, and the engine was cranked for start. Damage could occur to the engine.

The oil filter bypass valve, located between the pressure side of the oil pump and the oil filter, permits unfiltered oil to bypass the filter and enter the engine if the oil filter is clogged or during cold weather if congealed oil is blocking the filter during engine start. The spring loading on the bypass valve allows the valve to open before the oil pressure collapses the filter; in the case of cold, congealed oil, it provides a low-resistance path around the filter. Dirty oil in an engine is better than no lubrication.

Oil Filters

The oil filter used on an aircraft engine is usually one of four types: screen, Cuno, canister, or spin-on. A screen-type filter with its double-walled construction provides a large filtering area in a compact unit. *[Figure 6-6]* As oil passes through the

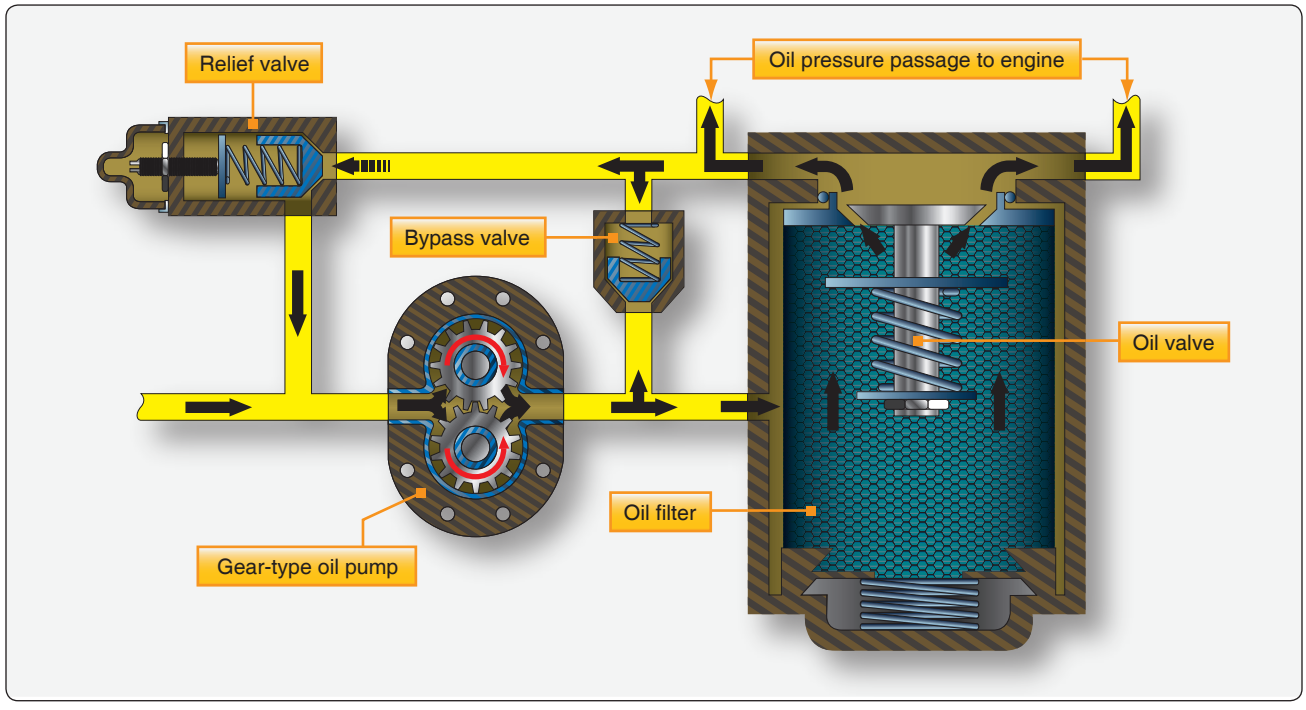

Figure 6-6. *Engine oil pump and associated units.*