

Advantages of Air Cooling

LIGHTER ENGINE

THE air cooling system transfers the heat of combustion directly from the cylinder to the atmosphere. The water cooling system transfers the heat of combustion from the cylinder to the cooling water and then to the atmosphere by means of the radiator. The direct method, air cooling, is lighter and much more simple since it eliminates the water, radiator, piping and shutters. The average installed weight of the water cooling system is roughly 0.6 pounds per horse-power, or for a 200 H.P. engine, about 120 pounds. This weight is saved with an air cooled engine.

LIGHTER AIRPLANE STRUCTURE

The airplane structure itself may be lighter with an air cooled engine since the installed power plant weight is much less. This is an indirect saving which frequently amounts to from 50% to 100% of the direct saving.

ACCESSIBILITY

The construction of the air cooled radial engine lends itself to easy accessibility. All cylinders and their accessories are interchangeable and any one may be removed without interfering with adjacent cylinders and with a minimum expenditure of time and labor. Carburetor, magnetos, spark plugs, oil pump, and fuel pump are all conveniently located for easy adjustment.

RELIABILITY

The record established by air cooled aviation engines during the past few years has definitely proven this type of power plant superior to the water cooled type for both commercial and military purposes. Records show that about 30% of all forced landings with water cooled engines are caused by failures in the cooling system. Not only is this cause of forced landings entirely eliminated by air cooling but the general mechanical reliability of the air cooled engine is unequalled.

DURABILITY

Reliable records on a large number of commercial and military Wright "Whirlwind" engines show the average period between overhauls to be about 250 hours. Many engines have run over three hundred hours, while some have done in excess of four hundred hours without major attention. The ultimate life of the engine is not definitely known, since engines with many hundreds of flying hours show no indication of approaching the end of their period of usefulness.

POWER AT ALTITUDE

Indications are that the air cooled radial engine retains its power at altitude better than the water cooled engine. This is probably due to the lower friction losses in the air cooled engine resulting from the reduced bearing areas on the crankshaft and camshaft.

ELIMINATION OF OIL COOLERS

Many water cooled aviation engines require oil coolers to maintain a moderate oil temperature. This accessory is not needed on the Wright "Whirlwind" air cooled radial engine.

RAPID WARMING-UP

The air-cooled engine requires much less time for warming-up. This is of importance in general commercial and military service and is particularly noticeable when operating in cold climates. Wright "Whirlwind" engines have operated with complete satisfaction in all climates, from the North Pole to the Equator, being free from both freezing and overheating.

REDUCED LENGTH

The air cooled engine is much shorter than the conventional water cooled engine, which, together with a considerable reduction in weight, permits a very compact and maneuverable airplane with maximum weight carrying and cubic capacity.

MAINTENANCE

By eliminating the water cooling system, which is essentially a fragile structure, and by the general accessibility of carburetor, spark plugs, magnetos and valve gear, the air cooled radial is much easier to maintain than the water cooled engine. The Wright "Whirlwind" may be completely overhauled without removal from the airplane.

SUMMARY

The air cooled engine is lighter, more reliable, more adaptable to variations in altitude and climatic conditions, easier to maintain, easier to overhaul, and for a given load results in a lighter, more compact and handier airplane.