Pratt & Whitney R-985 Wasp Junior

Conçu en 1929, le Wasp Junior était un neuf cylindres en étoile de 16,15 litres de cylindrée, d'une puissance de 450 à 550 ch. Prévu pour équiper des avions légers, de sport, d'entraînement ou des hélicoptères, il fut produit à plus de 39.000 exemplaires entre 1929 et 1953. Son poids était compris entre 250 et 310 kg, il tournait à environ 2.000/2.300 tr/min.

Il fut employé par exemple, sur le Broussard français, le Vultee Valiant, le Beech Expediter, les hydravions Beaver et Goose, l'hélicoptère S.51, l'appareil expérimental XV-3 ou l'appareil de vitesse Wedell-Williams 44, vainqueur du Trophée Thompson 1933 et du Trophée Bendix 1934.

En complément, vue d'un moteur neuf cylindres en étoile Pratt & Whitney R-985-AN-14B, et détail des cylindres. Montage sur un Beech 18 (modèle D18S, immatriculation N2913B, cn A-963, année de construction 1953, Aero Vintage Airlines), hélices bipales métalliques. Meeting Melun-Villaroche 2018.

Source : http://jnpassieux.fr/www/html/PW_R985.php

version anglaise

The **Pratt & Whitney R-985 Wasp Junior** is a series of nine-cylinder, air-cooled, radial aircraft engines built by the Pratt & Whitney Aircraft Company from the 1930s to the 1950s. These engines have a displacement of 985 in^3 (16 L); initial versions produced 300 hp (220 kW), while the most widely used versions produce 450 hp (340 kW). Wasp Juniors have powered numerous smaller civil and military aircraft, including small transports, utility aircraft, trainers, agricultural aircraft, and helicopters. Over 39,000 engines were built, and many are still in service today.

Design and development

Pratt & Whitney developed the R-985 Wasp Junior as a smaller version of the R-1340 Wasp to compete in the market for medium-sized aircraft engines. Like its larger brother, the Wasp Junior was an air-cooled, nine-cylinder radial, with its power boosted by a gear-driven single-speed centrifugal type supercharger. Its cylinders were smaller, however, with a bore and stroke of 5+3⁄16 in (132 mm), giving a 27% lesser total displacement. The Wasp Junior used many parts from the Wasp and even had the same mounting dimensions, allowing an aircraft to easily use either the smaller or the larger engine. The first run of the Wasp Junior was in 1929,and sales began in 1930. The initial version, the **Wasp Junior A**, produced 300 hp (224 kW). The U.S. military designated the Wasp Junior as the **R-985**, with various suffixes denoting different military engine models. However, Pratt & Whitney never adopted the R-985 designation scheme for its civilian Wasp Juniors, identifying them simply by name and model (e.g. "Wasp Junior A").

Pratt & Whitney followed the Wasp Junior A with more powerful models in the "A series". These had higher compression ratios, greater RPM limits, and more effective supercharging, and they led to the "B series". The first B series model was the **Wasp Junior TB**, which could maintain 420 hp (310 kW) at sea level and could reach 440 hp (330 kW) for takeoff. The TB was tuned for best performance at sea level; it was soon joined by the **Wasp Junior SB**, which was tuned for best performance at altitude and could sustain 400 hp (300 kW) at altitudes up to 5,000 ft (1,500 m), with 450 hp (340 kW) available for takeoff. A still later model, the **Wasp Junior T1B2**, had improved performance at low level, being able to sustain 450 hp (340 kW) up to 1,500 ft (460 m) while still matching the SB's power at high altitudes. The SB and T1B2, and later versions of these with similar performance, were the most popular Wasp Junior models. One later development of the T1B2, the **Wasp Junior B4**, was especially designed for vertical mounting in helicopters. During the mid-1930s, Pratt & Whitney developed a still greater improvement of the Wasp Junior, the "C series", with an even higher compression ratio and RPM limit. The only type produced in this series, the **Wasp Junior SC-G**, could sustain 525 hp (391 kW) at an altitude of 9,500 ft (2,900 m) and could produce 600 hp (450 kW) for takeoff. It also included reduction gearing to allow the high-revving engine to drive a propeller at suitable speeds, hence the "-G" suffix. Aviator Jacqueline Cochran flew a special Model D-17W Beechcraft Staggerwing with this engine in 1937, setting a speed and altitude record and placing third in the Bendix transcontinental race. However, the SC-G never got past the experimental stage.

Operational history

Early versions of the Wasp Junior were used in various small civilian and military utility aircraft, but only in limited numbers. The type became more popular later in the 1930s. It was selected for the Lockheed Model 10A Electra twin-engined airliner, as well as for other small twin-engined civil transports like the Lockheed Model 12A Electra Junior, the Beechcraft Model 18, and the Grumman Goose amphibious aircraft. It was also used in single-engined civilian utility aircraft like the Beechcraft Staggerwing, the Howard DGA-15, and the Spartan Executive. As World War II arrived, the U.S. military chose the Wasp Junior for the Vultee BT-13 Valiant and North American BT-14 basic training aircraft and for the Vought OS2U Kingfisher observation floatplane. Military versions of existing Wasp Junior-powered civilian aircraft were also produced, such as the military derivatives of the Beech 18, Beech Staggerwing, Grumman Goose, and Howard DGA-15. The Wasp Junior also powered some versions of the British Avro Anson and Airspeed Oxford twin-engined trainers. The demands of World War II led to the production of many thousands of Wasp Juniors. Until the end of the war, the Wasp Junior's closest competitor was Wright Aeronautical's R-975 Whirlwind. However, during the war, the Wasp Junior was far more widely used in aircraft than the R-975, and Wright ceased production of the R-975 in 1945.

After World War II, many military-surplus aircraft with Wasp Junior engines entered the civilian market. New designs based on the Wasp Junior were also introduced, such as the Sikorsky H-5 helicopter, the de Havilland Canada DHC-2 Beaver, and Max Holste Broussard bush airplanes, and agricultural aircraft such as the Snow S-2B and S-2C, Grumman Ag Cat, and Weatherley 201. Pratt & Whitney ceased production of the Wasp Junior in 1953, having built 39,037 engines. Many Wasp Junior engines are still in use today in older bush planes and agricultural planes, as well as in antique aircraft. Some antique aircraft, such as the Boeing-Stearman Model 75, which originally used other engines, have had them replaced with the Wasp Junior to provide more power or for easier maintenance, since parts for the Wasp Junior are readily available.

R-985 fitted to a DHC-2 Beaver

Variants

Wasp Junior A
U.S. military version: R-985-1
300 hp (220 kW) at 2,000 RPM at sea level and for takeoff. First production version.

Wasp Junior S2A

Wasp Junior TB, TB2
U.S. military versions: R-985-9, -11, -11A, -21, -46
420 hp (310 kW) at 2,200 RPM at sea level, 440 hp (330 kW) at 2,300 RPM for takeoff. Early B-series versions rated for sea-level performance.

Wasp Junior SB, SB2, SB3
U.S. military versions: R-985-13, -17, -23, -33, -48, -50; R-985-AN-2, -4, -6, -6B, -8, -10, -12, -12B, -14B
400 hp (300 kW) at 2,200 RPM up to 5,000 ft (1,500 m), 450 hp (340 kW) at 2,300 RPM for takeoff. Common B-series versions were rated for performance at altitude.

Wasp Junior T1B2, T1B3
U.S. military versions: R-985-25, -27, -39, -39A; R-985-AN-1, -1A, -3, -3A
450 hp (340 kW) at 2,300 RPM up to 1,500 ft (460 m) and for takeoff. Common B-series versions with improved sea-level performance

Wasp Junior B4
U.S. military versions: R-985-AN-5, -7.
450 hp (340 kW) at 2,300 RPM up to 2,300 ft (700 m) and for takeoff Vertically mounted development of T1B3, for helicopters

Wasp Junior SC-G
525 hp (391 kW) at 2,700 RPM up to 9,500 ft (2,900 m), 600 hp (450 kW) at 2,850 RPM for takeoff Experimental high-powered version with propeller reduction gearing.

source : https://en.wikipedia.org/wiki/Pratt_%26_Whitney_R-985_Wasp_Junior