Travel Air D-4000 Speed Wing
History
By Robert M. Murrell

Manufacture

Airplane

Name of Manufacturer - Travel Air Company
Manufacturer's Address – Wichita, Sedgwick County, Kansas
Date of Manufacture – February 1930
Manufacturer's Model – D-4000 Speed Wing (Biplane)
Manufacturer's Serial Number – 1379
Manufacturer's Approved Type Certificate Number[1i] – Group 2[2]
D.O.C. Number[3] – NC-477 N[ii]

Inspection

Inspection Date – February 15, 1930
Inspection Place – Travel Air Company Factory
Inspection Result - Approved

Engine

Engine Type – J-5[4iii] / 220 HP
Engine Manufacturer – Wright Aeronautical Corporation
Engine Number – B-8649 (customer's engine)

Owner No. 1

H. C. Lippiatt (Herbert Cecil Lippiatt was an aircraft distributor for Travel Air and Waco.)
121 Udine Way
Bel Air, Los Angeles, California
U.S. Citizen – Yes
License - Commercial
Ownership – Individual
Date of Purchase - February 14, 1930
Purchase Price - $4,311 (equal to $58,411.29 in 2014 dollars)

Owner No. 2

J. F. Forbes
Permanent Address – Lewistown, Montana
Temporary Address - Mayflower Hotel, 533 South Grand Avenue, Los Angeles, California
U.S. Citizen – Yes
License - Commercial
Ownership – Individual
Date of Purchase - June 16, 1930
Purchase Price - $5,600 (equal to $75,876.41 in 2014 dollars)

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[1] The Approved Type Certificate for the "Travel Air 4000" was Certificate Number 32, issued in 1928 (issued from 1927 through 1958).
[2] The Group 2 Memo for the "Curtiss-Wright T/Air D-4000" was 2-84, issued in 1929 (issued from 1929 through 1947).
[3] Department of Commerce Identification Number (commonly known as the tail number).
[4] Wright Whirlwind was a family of air-cooled radial aircraft engines built by Wright Aeronautical (originally an independent company, later a division of Curtiss-Wright). The J5 was a 9-cylinder, air-cooled single row fixed radial engine.

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[i] The U.S. government mandated aircraft manufacturers submit design data to receive approval to build an aircraft for public use. The data included technical blueprints depicting the design, materials, components, dimensions and geometry of the aircraft, in addition to engineering analysis and test data. After submission and approval, manufacturers received an “Approved Type Certificate” (ATC), or a “Group 2” approval which were to be held for future reference and comparison. A type certificate is issued to signify the airworthiness of an aircraft manufacturing design. Airworthiness is the measure of an aircraft's suitability for safe flight. An "Airworthiness Certificate" is issued for each aircraft that is properly registered if it conforms to its type design. The airworthiness certificate is valid and the aircraft may be operated as long as it is maintained in accordance with the rules issued by the regulatory authority.

[ii] The U.S. received the "N" as its nationality designator under the International Air Navigation Convention, held in 1919. The Convention prescribed an aircraft-marking scheme of a single letter indicating nationality followed by a hyphen and four identity letters (for example, G-REMS). The five letters together were to be the aircraft's radio call sign. No mention of N numbers appeared in the initial Air Commerce Regulations placed in effect by FAA's first predecessor agency in December 1926. The letter markings that this original set of rules specified were C (commercial), S (state), and P (private), which were to precede the numbers assigned to licensed aircraft. The earliest legal requirement for the N marking is found in the first general amendments to the Air Commerce Regulations on March 22, 1927. A second letter indicating the aircraft's airworthiness category followed the N and preceded the identification numbers. These airworthiness indicators were; "C" for standard, "R" for restricted, "X" for experimental, and later an "L" for limited, (for example, NC1234).

[iii] The Wright Whirlwind was a family of air-cooled radial aircraft engines built by Wright Aeronautical (originally an independent company, later a division of Curtiss-Wright). The family began with nine-cylinder engines, and later expanded to include five-cylinder and seven-cylinder varieties. Fourteen-cylinder twin-row versions were also developed, but these were not commercially produced.

Radial engine

A Pratt & Whitney R-2800 engine

This type of engine has one or more rows of cylinders arranged around a centrally located crankcase. Each row generally has an odd number of cylinders to produce smooth operation. A radial engine has only one crank throw per row and a relatively small crankcase, resulting in a favorable power-to-weight ratio. Because the cylinder arrangement exposes a large amount of the engine's heat-radiating surfaces to the air and tends to cancel

reciprocating forces, radials tend to cool evenly and run smoothly. The lower cylinders, which are under the crankcase, may collect oil when the engine has been stopped for an extended period. If this oil is not cleared from the cylinders prior to starting the engine, serious damage due to hydrostatic lock may occur.

Most radial engines have the cylinders arranged evenly around the crankshaft, although some early engines, sometimes called semi-radials or fan configuration engines, had an uneven arrangement. The best known engine of this type is the Anzani engine, which was fitted to the Bleriot XI used for the first flight across the English Channel in 1909. This arrangement had the drawback of needing a heavy counterbalance for the crankshaft, but was used to avoid the spark plugs oiling up.

In military aircraft designs, the large frontal area of the engine acted as an extra layer of armor for the pilot. Also air-cooled engines, without vulnerable radiators, are slightly less prone to battle damage, and on occasion would continue running even with one or more cylinders shot away. However, the large frontal area also resulted in an aircraft with an aerodynamically inefficient increased frontal area.

Wright Whirlwind J5 Engine Specifications
Configuration: 9-cylinder, air-cooled single row fixed radial
Output: 220 hp @ 2,000 RPM
Weight: 500 lb
Displacement: 788 in^3
Bore x Stroke: 4.5” x 5.5”
Compression Ratio: 5.4:1
Mean Effective Pressure: 123 psi
Specific Weight: 2.27 lb/hp
Specific Output: 0.28 hp/in^3
Cruise Fuel Consumption: 13.2 gal/hr @ 75% power
Cruise Specific Fuel Consumption: 0.45 lb/hp/hr @ 75% power
Cruise Oil Consumption: 0.77 gal/hr @ 75% power
Cruise Specific Oil Consumption: 0.035 lb/hp/hr @ 75% power
6 hr mission specific weight: 0.99 lb/hp/hr (engine + fuel + oil @ 75% power)