Lindbergh believed that multiple engines resulted in a greater risk of failure while a single-engine design would give him greater range. To increase fuel efficiency, the *Spirit of St. Louis* was also one of the most advanced and aerodynamically streamlined designs of its era.
Lindbergh believed that a flight made in a single-seat monoplane designed around the dependable Wright J-5 Whirlwind radial engine provided the best chance of success. The Ryan NYP had a total fuel capacity of 450 U.S. gallons (1,700 L; 370 imp gal) or 2,710 pounds (1,230 kg) of gasoline, which was necessary in order to have the range to make the anticipated flight non-stop. The fuel was stored in five fuel tanks, a forward tank – 88 U.S. gal (330 L; 73 imp gal), the main – 209 U.S. gal (790 L; 174 imp gal), and three wing tanks – total of 153 U.S. gal (580 L; 127 imp gal).[5] Lindbergh modified the design of the plane's "trombone struts" attached to the landing gear to provide a wider wheelbase in order to accommodate the weight of the fuelAt Lindbergh's request, the large main and forward fuel tanks were placed in the forward section of the fuselage, in front of the pilot, with the oil tank acting as a firewall. This arrangement improved the center of gravity and reduced the risk of the pilot being crushed to death between the main tank and the engine in the event of a crash. This design decision meant that there could be no front windshield, and that forward visibility would be limited to the side windows. This did not concern Lindbergh as he was accustomed to flying in the rear cockpit of mail planes with mail bags in the front. When he wanted to see forward, he would slightly yaw the aircraft and look out the side. To provide some forward vision as a precaution against hitting ship masts, trees, or structures while flying at low altitude, a Ryan employee who had served in the submarine service installed a periscope which Lindbergh helped design. It is unclear whether the periscope was used during the flight. The instrument panel housed fuel pressure, oil pressure and temperature gauges, a clock, altimeter, tachometer, airspeed indicator, bank and turn indicator, and a liquid magnetic compass. The main compass was mounted behind Lindbergh in the cockpit, and he read it using the mirror from a women's makeup case which was mounted to the ceiling using chewing gum.[6] Lindbergh also installed a newly developed Earth Inductor Compass made by the Pioneer Instrument Company which allowed him to more accurately navigate while taking account of the magnetic declination of the earth.[7] Lindbergh's ultimate arrival in Ireland deviated from his flight plan by just a few miles.[6]
Lindbergh sat in a cramped cockpit which was 36 in × 32 in × 52 in (91 cm × 81 cm × 132 cm) in width, length, and height. It was so small, Lindbergh could not stretch his legs, nevertheless it was to be his home for nearly two days and nights over the Atlantic. The *Spirit of St. Louis* was powered by a 223 hp (166 kW), air-cooled, nine-cylinder Wright J-5C Whirlwind radial engine. The engine was rated for a maximum operating time of 9,000 hours (more than one year if operated continuously) and had a special mechanism that could keep it clean for the entire New York-to-Paris flight. It was also, for its day, very fuel-efficient, enabling longer flights carrying less fuel weight for given distances.[Note 1] Another key feature of the Whirlwind radial engine was that it was rated to self-lubricate the engine's valves for 40 hours continuously. Lubricating, or "greasing," the moving external engine parts was a necessity most aeronautical engines of the day required, to be done manually by the pilot or ground crew prior to every flight and would have been otherwise required somehow to be done during the long flight.[8]
The engine was built at Wright Aeronautical in Paterson, New Jersey, by a 24-year-old engine builder, Tom Rutledge, who was disappointed that he was assigned to the unknown aviator, Lindbergh. Four days after the flight, he received a letter of congratulations from the Wright management.[8][9]The race to win the prize required time-saving design compromises. Donald A. Hall decided that the empennage (tail assembly) and wing control surfaces would not be altered from his original Ryan M-2 design, thus minimizing redesign time that was not available without delaying the flight. The result was less aerodynamic stability; nevertheless, the experienced Lindbergh approved the unaltered design.[10] This setup resulted in a negatively stable design that tended to randomly introduce unanticipated pitch, yaw, and bank (roll) elements into its overall flight characteristics. There is a dispute regarding whether Hall and Lindbergh also preferred this design because they anticipated that the continuous corrections to the random movements of the aircraft would help to keep Lindbergh awake during the estimated 40-hour flight. Whether or not the unstable design was deliberately retained to help fight fatigue, Lindbergh did later write how these

random unanticipated movements helped keep him awake at various times during the flight.[11] The stiff wicker seat in the cockpit was also purposely uncomfortable, although custom-fitted to Lindbergh's tall and lanky frame.The race to win the prize required time-saving design compromises. Donald A. Hall decided that the empennage (tail assembly) and wing control surfaces would not be altered from his original Ryan M-2 design, thus minimizing redesign time that was not available without delaying the flight. The result was less aerodynamic stability; nevertheless, the experienced Lindbergh approved the unaltered design.[10] This setup resulted in a negatively stable design that tended to randomly introduce unanticipated pitch, yaw, and bank (roll) elements into its overall flight characteristics. There is a dispute regarding whether Hall and Lindbergh also preferred this design because they anticipated that the continuous corrections to the random movements of the aircraft would help to keep Lindbergh awake during the estimated 40-hour flight. Whether or not the unstable design was deliberately retained to help fight fatigue, Lindbergh did later write how these random unanticipated movements helped keep him awake at various times during the flight.[11] The stiff wicker seat in the cockpit was also purposely uncomfortable, although custom-fitted to Lindbergh's tall and lanky frame.The race to win the prize required time-saving design compromises. Donald A. Hall decided that the empennage (tail assembly) and wing control surfaces would not be altered from his original Ryan M-2 design, thus minimizing redesign time that was not available without delaying the flight. The result was less aerodynamic stability; nevertheless, the experienced Lindbergh approved the unaltered design.[10] This setup resulted in a negatively stable design that tended to randomly introduce unanticipated pitch, yaw, and bank (roll) elements into its overall flight characteristics. There is a dispute regarding whether Hall and Lindbergh also preferred this design because they anticipated that the continuous corrections to the random movements of the aircraft would help to keep Lindbergh awake during the estimated 40-hour flight. Whether or not the unstable design was deliberately retained to help fight fatigue, Lindbergh did later write how these random unanticipated movements helped keep him awake at various times during the flight.[11] The stiff wicker seat in the cockpit was also purposely uncomfortable, although custom-fitted to Lindbergh's tall and lanky frame.Lindbergh also insisted that unnecessary weight be eliminated, even going so far as to cut the top and bottom off of his flight map. He carried no radio in order to save weight and because the radios of the period were unreliable and difficult to use while flying solo. Also, although he was an airmail pilot, he refused to carry souvenir letters on the transatlantic journey, insisting that every spare ounce be devoted to fuel. The fuselage was made of treated fabric over a metal tube frame, while the wings were made of fabric over a wood frame. The plywood material that was used to build most of Lindbergh's plane was made at the Haskelite Manufacturing Corporation in Grand Rapids, Michigan.[12]