History and Development of the Wright "Whirlwind" Engine

THE current Wright "Whirlwind" Model J-5 is the result of seven years' intensive development on one type of engine without alteration in bore and stroke and without changing any basic feature of the original design. The development contract under which this series of models began was dated February 28th, 1920. Since that time seven successive models have been developed and over a thousand engines sold, practically all going into immediate service where thousands of flying hours have been accumulated. This service testing in the hands of the United States Navy and many commercial interests has resulted in a wealth of practical experience and technical data, which has formed the groundwork for further improvement in detailed design. These improvements have first been developed and tested in the laboratory through extensive dynamometer trials and later supplemented by flight tests where average service conditions were simulated. When conclusively proven, the changes have been definitely adopted as standard and made a feature of the next production run of engines.

This policy of gradual improvement and perfection has resulted in a sound development where each successive model has contained improvements dictated by service experience with the preceding engine, and in which each model has been uniformly successful. No other American air cooled engine has such a history; in fact, the successful development of the Wright "Whirlwind" engine has been largely responsible for the American acceptance of air cooling as an ideal for aviation service.

At the close of the World War the entire American aircraft engine industry was concentrated on the production of water cooled engines. This concentration was logical, since the early American aircraft engines using the water cooling principle had been more successful than the early attempts at the use of air cooling. Up to this time no American air cooled engine producing more than 100 H.P. had been successfully constructed, and it was generally felt that the expense of developing this principle, with the attendant difficulties, would be so great as to be unwarranted by the funds available at that time. It is fortunate, however, that among those responsible for the future success of American naval, military and commercial aviation were a few farsighted men whose faith in the principle of air cooling led them to devote their time and the funds available to further development of this type of engine.

In 1916 Mr. Charles L. Lawrance started a development of air cooled engines of small power. His early experiments led him to the belief that larger powers could be successfully constructed, and it was largely through his efforts that an experimental contract for the development of a 9-cylinder, 140 H.P. air cooled radial engine was awarded by the United States Army early in 1920. Immediately thereafter the United States Navy also gave Mr. Lawrance a contract for a similar type of engine to have a guarantee of 200 H.P. at 1,800 R.P.M. These two engines were developed simultaneously and both passed their fifty-hour acceptance tests early in 1921. This second engine, designed and constructed for the United States Navy, was the forerunner of the now famous series of Wright "Whirlwind" engines, having a bore of 4½ inches and a stroke of 5½ inches, and rated at 200 H.P. at 1,800 R.P.M. Since that time seven successive models have been produced without alteration in the basic design. These models have been the J-1, J-2, J-3, J-4, J-4A, J-4B and J-5. Each model has been produced in quantity for the United States Navy before being released for commercial sale. In this way commercial aviation in the United States has been given the benefit of time-tested engines of a design already approved and tried by the United States Navy. The current models, J-5C and J-5CA, combine all the experience with the preceding engines and constitute a refinement which goes far beyond their capabilities.

It is the policy of the Wright Company to incorporate engine improvements and minor new developments in their engines as rapidly as possible. To designate each factory run of engines of exactly the same detailed design, capital letters are added to the basic model designation. In this way the Model J-4A was a refinement of the Model J-4, and in a similar way the Models J-5C and J-5CA indicate minor modifications of the basic Model J-5 design.

The rapid development of American commercial aeronautics came coincident with the Wright "Whirlwind" Model J-4B, and it was this engine which was so successfully and so widely used in commercial enterprises during the year 1926. In competition with war surplus engines at much lower first cost, the Wright "Whirlwind" has demonstrated its outstanding efficiency to such an extent that many commercial interests have disregarded the higher original investment and gained their increased profits through lower operating expenses throughout the greater life of the "Whirlwind" engine. It has frequently been proven that the operation expense of a modern air cooled radial engine is much lower than that of the war surplus water cooled type; that its ultimate life is much greater; that the differential in first cost is rapidly overcome; and that in the end the modern air cooled engine will prove more economical.