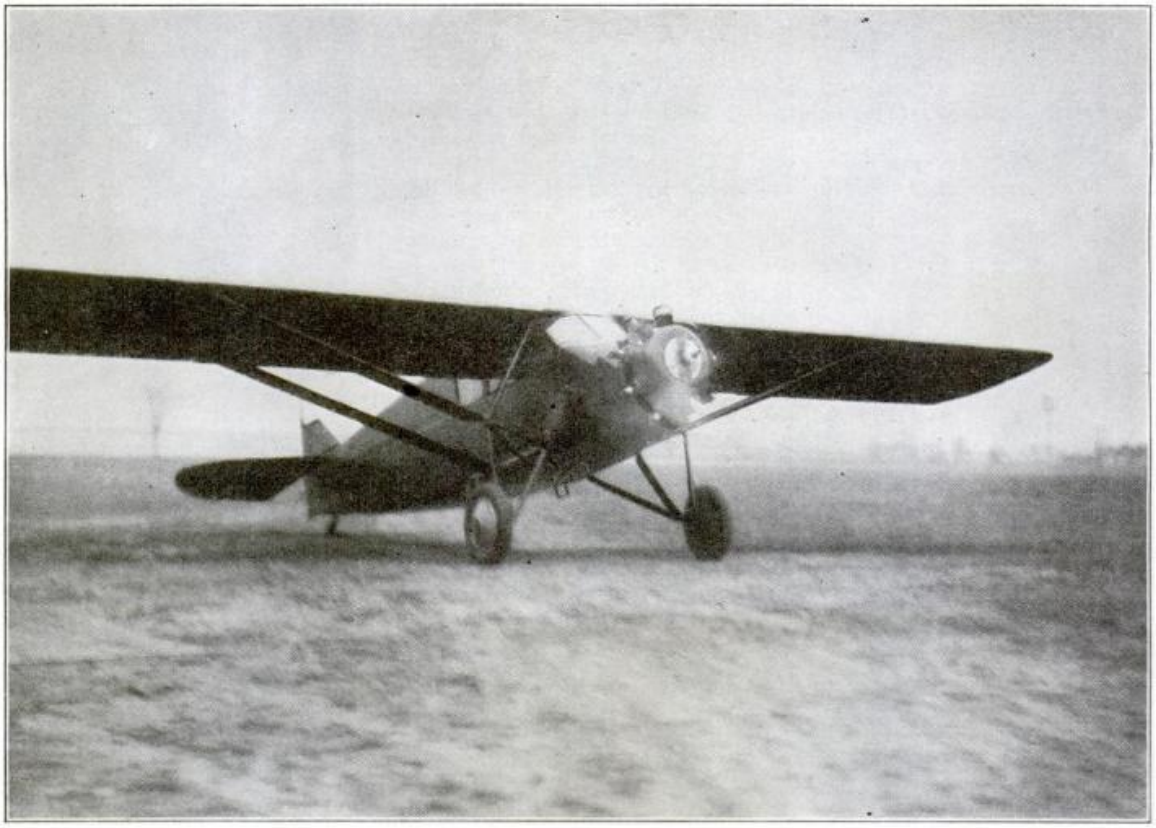

The Diesel-powered Stinson-Detroiter.

And Now—the Diesel

By Edward A. Stinson

WITH all the conflicting stories relating to the development of the Diesel engine as a motive power for aircraft it might be well to give the actual facts about the one engine which has made a public appearance.

Late in the summer of 1928 the Packard Motor Car Company of Detroit purchased a six passenger Stinson-Detroiter from the Stinson Aircraft Corporation in order to make exhaustive flying tests of their new Diesel aircraft engine. The plane was a standard model, one which is ordinarily equipped with a 225-horsepower Wright J5 Whirlwind.

In accordance with instructions the plane was delivered to the Packard Motor Car Company without the engine mounting or the exhaust ring. This construction detail was left strictly to the Packard engineers since absolute secrecy surrounded their research work with the Diesel engine.

Upon satisfactory installation of the Diesel engine the entire plane was carefully checked by a Stinson service man and the first test flights were made from the Packard proving grounds near Utica, Michigan.

So that conditions might duplicate those of actual service as closely as possible, no changes were made in the plane itself. It was fitted with dual wheel control, every comfort for the six passengers was fitted, there was a baggage compartment located at the rear of the cabin with access from an interior door, and the plane was finished in a black and orange color combination.

Constructionally the plane was standard, with a seamless steel tubing fuselage. The entire plane was fabric covered and treated with six coats of dope before the final color coat was applied. The airfoil section was the M-6 curve, and wings were made of one-piece spruce spars, with spruce ribs and Warren truss reinforced compression tubes.

Mention of successful flights seldom appeared in the newsprints. Many flights were made, however, and there was a good deal of unconfirmed rumor concerning the new engine. One epochal flight was made, with a famous celebrity as a passenger. Readers will remember the visit of the Crown Prince of Spain, who is an aviation enthusiast, to the United States.. While in Detroit he was the guest of Alvin MacCauley, president of the Packard Motor Car Company. It was during this visit that he made a short trip in the Diesel equipped plane, with Captain Woolson and W. E. Lees, the company's test pilot. The Crown Prince was highly enthusiastic over the performance of the plane with the new motor.

Late in the Spring of 1929 sufficient progress had been made with the Diesel engine so that a public announcement could be made safely.

The fourth annual aeronautical conference of the National Advisory Committee for Aeronautics was to be held in Washington the week of May 12, and it was decided to announce publicly the engine at that time.

Accordingly, the Stinson-Detroiter was made ready for the flight, and early Tuesday morning, May 14, Captain

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come to rest where it first touches the ground. The way in which the landing run is reduced by a head wind depends on the design of the plane the coefficient of ground friction, etc. Figure 10 shows a typical instance of how the landing run is reduced by head winds of various intensities.

Why a Field with Obstacles at the Boundary Has to Be Larger

The effective length of a field runway is reduced by an obstacle of some height at the boundary. If there is no obstacle, the pilot can start his landing glide well ahead of the field and land at the very boundary. When there is an obstacle of say 50 feet, and with a glide of 1 in 7, he can only land $50 \times 7 = 350$ feet from the boundary as illustrated in Figure 11. An effective decrease of runway is calculated in this fashion by the Department of Commerce in rating airports.

Questions

1. The hypothetical machine of Article 7 is gliding at an incidence of 1 degree. What is the L/D of the plane at this incidence? What is the air speed? What is the angle of the glide path with the horizontal?

2. If the pilot could suddenly change the incidence to that of maximum Ky just before touching the ground, what would be the lift of the wings at this instant?

3. A manufacturer advertises a monoplane weighing 2,600 pounds, and having a wing area of 200 square feet as having a landing speed of 35 miles an hour. How far off is he likely to be?

4. A student lands a machine without flattening out from a glide of 6 degrees to the horizontal, the air speed being 80 miles an hour. What will be the vertical velocity on striking the ground?

5. A plane is gliding at 70 miles per hour, on a glide path of 1 in 7. There is a horizontal tail wind of 20 miles per hour. What will be the steepness of the glide relative to the ground?

6. A field has a row of trees at its boundary, 50 feet high. The hypothetical machine of Article 7 is gliding over this obstacle at its best angle of glide. Its landing run is 300 feet. How far from the base of the trees will it land?

And Now—The Diesel

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L. M. Woolson, chief designer of the engine, hopped off with W. E. Lees, pilot, for Langley field. The flight from Detroit to the field required approximately seven hours and was made at an average speed of 85 miles an hour. The distance flown totalled 685 miles, due to the particular course followed by Pilot Lees.

Upon their arrival, Woolson sent the following wire:

> "Arrived after six hours and fifty minutes' uneventful flight, consuming $4.68 worth of furnace oil."

As the fuel oil the Diesel burns costs 8.7 cents per gallon, Woolson's consumption of $4.68 worth equals 54 gallons. A 200-horsepower gas engine, burning aviation gasoline which costs about 30 cents per gallon, would consume 13 gallons per hour, or 78 gallons in six hours, at a cost of $23.40.

On his departure from Detroit, Woolson carried more than 100 gallons of oil, sufficient for his return without refueling. The fact that he could take the plane such a distance without special rigging for starting dispels the rumors which have claimed that the problem of starting a high compression engine such as the Diesel was one that could only be met with special equipment.

Although the Diesel weighs more than gasoline engines of equal horsepower, estimated at three pounds per horsepower as compared to two pounds per horsepower, the difference is more than compensated by the disparity in weight of required fuel loads. There are nine cylinders in the Packard Diesel which operate independently of each other, giving the effect of nine different engines.

Another advantage will be lack of radio interference while a plane is communicating with the ground, since the construction of the engines requires no electrical apparatus for ignition purposes. Carburetion points are eliminated, greatly reducing the fire hazard.

According to Packard officials the choice of airplane equipment for test purposes on the new Diesel engine reached around several types of plane. Final choice of Stinson equipment resulted from their ability to carry the heaviest loads with full dependability and low horsepower engine rating.

Besides being used for exclusive tests on the Diesel engine, Stinson planes are also being used by the Continental Motors Corporation of Detroit, the Warner Aircraft Company and on the new series of Lycoming engines now being tested by the Auburn Motor Company of Auburn, Indiana.

Picked Up in the Hangars

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jury I suffered was some bruises and contusions, from which I am now completely recovered. I declined to enter an ambulance, but took another taxicab and went to our office.

"The following day I started back home by train. As our train was pulling out of the station in St. Louis a freight train backed out of a siding, crashed into our observation car, knocking it off the track. Fortunately, I again was uninjured. The observation car was uncoupled from the rest of the train, and after a considerable delay we proceeded on our way to New York.

"For the sake of safety I would recommend that hereafter all trips possible be made by airplane."

How Simple Aviation Is!

Here is what various persons have told W. J. Powers, service shop foreman at the Fairchild Aviation Corporation's plant at Farmingdale, Long Island, that certain aviation terms mean. At least, Powers says they told him.

BASSWOOD: Wood used on seaplanes.

BELLCRANK: The thing you turn to let the pilot know you are ready to start.

CONTROL STICK: The lever they use when the steering apparatus gets stuck.

DOPE: Advice given by the pilot.

FLAP: A piece of the wings that flutters when the plane is falling.

FUSELAGE: The airplane's insides.

PROPELLER: The whirligig in front of the motor that makes a loud hum to let the passengers know the airplane is moving.

RIBS: The sticks to keep the covering wrapped around the outside.

RUDDER: The part of the tail used for steering when the plane falls into the water.