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The DIESEL in the AIR

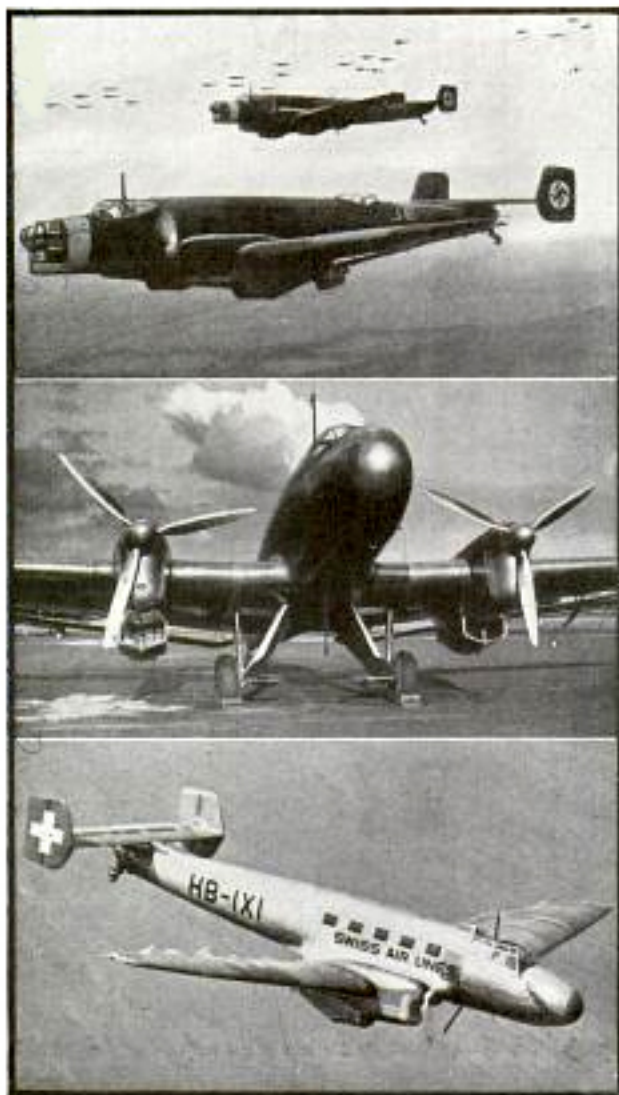


The "Nordmeer" waiting to be hoisted on board catapult ship after transatlantic crossing. This seaplane is equipped with four 600-horsepower Diesel engines.

MANY Diesel-engined planes are now in use in Europe and their number is rapidly increasing every year. This change-over from the gasoline engine started in 1931, when a plane equipped with a Junkers Diesel was tried out by Deutsche Lufthansa, Germany's national air line. That year, only 1,634 miles were flown, but from that small beginning Diesel mileage has increased steadily. Last year, at least 25,000 miles a week were flown with Diesel-engined craft and this

By Paul H. Wilkinson
Author of "Diesel Aircraft Engines"

year, from all indications, the mileage will be near the 50,000-mile-a-week mark. The engine making these flights possible is the Junkers "Jumo" Diesel. Development work commenced as far back as 1912, so many years elapsed before success was attained. Now, the importance of the Diesel can be judged from the fact that a huge new factory near Dessau has been built to produce these "Jumo" power plants. The current production model is the "Jumo" 205, which has power ratings



Top, Junkers Ju 86 K fighter-bombers are Diesel powered. Center, German air liner powered with water-cooled Diesel engines. Bottom, air liner in Swiss Air service is driven by Diesels

ranging from about 500 to 700 horsepower.

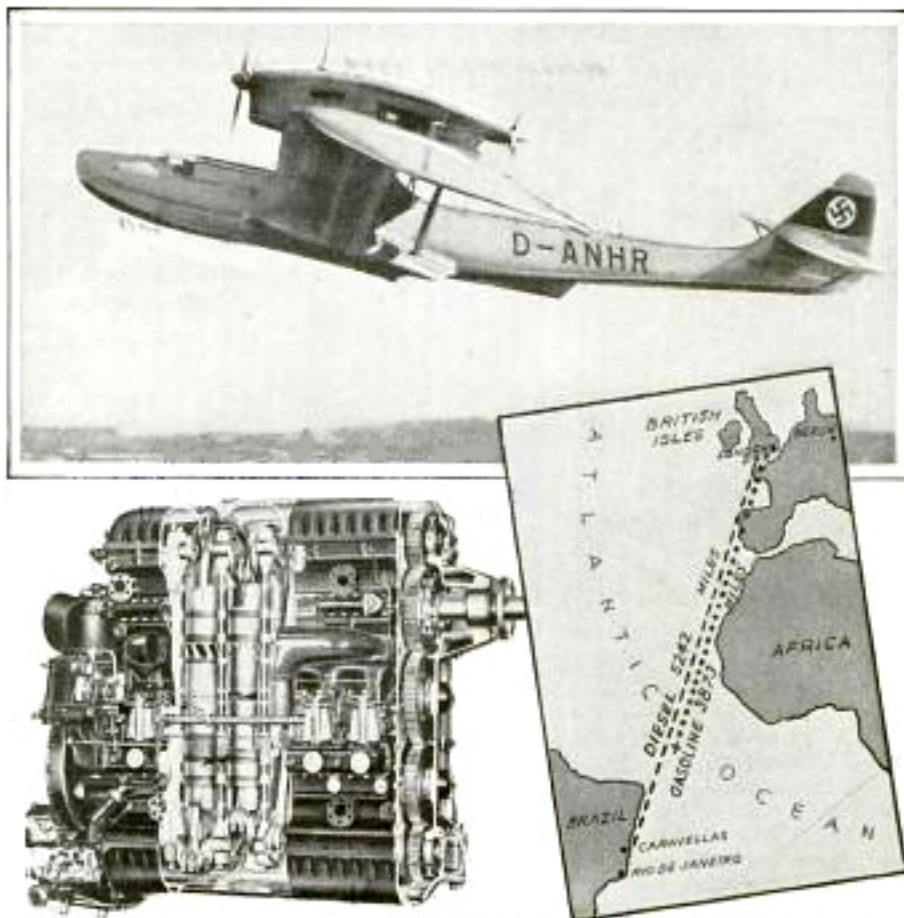
Deutsche Lufthansa uses Diesel-engined planes on many of its routes in Germany, and on routes to Holland, Switzerland, Poland and Denmark. Swiss Air, too, employs the Diesel on its air lines between Zurich and Vienna. The plane in which the engine is most extensively used is a

product of the same concern which builds the engines. This is the Junkers Ju 86, a modern all-metal, ten-passenger air liner similar in appearance to the twin-engined Lockheed in this country. Powered with two 600-horsepower "Jumo" 205 Diesels, it cruises at 175 miles per hour and has a range of about 1,000 miles.

Versatility of the engines on these planes was demonstrated a short time ago when one of them visited Kabul, in Afghanistan. In that remote region, Diesel fuel was unobtainable but there was plenty of kerosene available, so the plane was tanked up and continued on its way, 950 miles to its next port of call, without difficulty.

The "Jumo" Diesel is also utilized for military purposes. The military version of this plane is the Ju 86 fighter-bomber extensively used by the German Air Corps. These planes have special turbo-supercharged engines which develop their rated power of 700 horsepower at an altitude of 20,000 feet. Many squadrons of these bombers are in service, and the engine is being tried out on other types of fighting craft.

On air-mail routes, the Diesel has some fine flights to its credit. Outstanding was the 3,600-mile non-stop flight of a Junkers Ju 86 mailplane with its crew of three from the factory at Dessau, to Bathurst in British Gambia, on the west coast of Africa. This flight was first accomplished in 1936, at an average speed of 180 miles per hour. Since then, it has been repeated frequently. The maximum range of these planes, carrying



Top, Diesel flying boat which set world's seaplane distance record. Bottom, left, sectioned view of aviation Diesel. Right, map shows distances that two similar planes of equal fuel capacity would travel if one were equipped with Diesel engines and the other with gasoline engines. The Diesel gives about one-fourth more miles per gallon under average flying conditions.

1,000 pounds of mail, is about 4,000 miles.

From Bathurst, Deutsche Lufthansa operates a fleet of four Dornier Do 18 flying boats across the 1,900-mile stretch of the South Atlantic to Natal, in Brazil. These planes are named the "Aeolus," the "Zephyr," the "Pampero" and the "Zyklon." Their engine installation is noteworthy in that it consists of two 600-horsepower "Jumo" 205 Diesels mounted in tandem, back to back, along the axis of the plane. This makes possible excellent streamlining of the engine nacelle, and as the propellers then revolve in opposite directions, their torque is neutralized. The Do 18 carries a

crew of four, has a cruising speed of 125 miles per hour, and can carry a 1,000-pound payload a distance of 2,400 miles.

The "Aeolus" and the "Zephyr" will be remembered for their survey flights across the North Atlantic in 1936, when they made eight scheduled flights between New York and the Azores. So well did their engines perform over the 2,400 miles between these points, that two larger planes with similar power plants were ordered by Deutsche Lufthansa for their 1937 flights. These powerful Hamburg Ha 139 seaplanes, the "Nordmeer" and the "Nord-

(Continued to page 134A)

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The Diesel in the Air

(Continued from page 163)

wind," were equipped with four 600-horsepower engines. Once again, they demonstrated the reliability of the Diesel by making fourteen trips over the same route.

Catapulting is used extensively for launching these Diesel-engined mailplanes, as Germany lacks bases from which to operate. Although this involves the use of catapult ships, it has the advantage that the plane can take to the air with full load without risking a take-off from a choppy sea. At present, catapulting is not suitable for passenger planes as the rate of acceleration is too rapid.

For long-range flights, the Diesel is particularly economical. This was demonstrated when a Dornier Do 18 flying boat made a 5,200-mile non-stop flight from the English Channel to Caravelas, in Brazil. This broke the world's long-distance seaplane record by nearly 1,000 miles, thanks to the remarkable fuel economy of the Junkers "Jumo" 205 engines. A fuel saving of approximately twenty-three per cent, compared with gasoline operation, is now obtained under average conditions. Another advantage is the saving in fuel cost. Aviation gasoline costs about eleven cents a gallon at refinery, compared with five cents a gallon for Diesel fuel.

Perhaps the most important factor is that Diesel fuel does not give off inflammable vapor at ordinary temperatures like gasoline, so there is no danger of an explosion from this source.

The Junkers factory is engaged in the type-testing of their 1,200-horsepower "Jumo" 206 Diesel, and in the construction of a new type which is to develop 2,000 horsepower. The latter will not follow the six-cylinder, in-line construction of their other Diesels, but will be a "square" engine with four banks of six cylinders and a crankshaft at each corner. So compact will the engine be, that its diameter will not exceed thirty-nine inches. Its weight will be about one pound per horsepower.

The United States, England, France, Japan and Russia are all working with the Diesel. Next year, huge flying boats carrying passengers and mail, powered with 2,000-horsepower Diesels, may take their place for transatlantic travel. Ultimately the Diesel may become the most popular power plant for long-distance flights.