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The Brown Boveri gas turbine locomotive, the first of its kind in this country, has now gone into service on the western lines of British Railways. It was ordered in the Autumn of 1946 from British Brown Boveri Limited by the former Great Western Railway Company, and was built at the Brown Boveri Works in Baden and Muenchenstein. It was completed towards the end of last year, and after successful trial runs on the Swiss lines, during which speeds of over 90 miles per hour were obtained, the locomotive was sent via France, Luxembourg, and Belgium to Zeebrugge, and then shipped by ferryboat to Harwich. Since the beginning of February the locomotive has been subject to the usual tests on the British lines, and has covered several thousands of miles during trial runs.

The main principle of the gas turbine electric locomotive is that the heat content of the fuel is directly converted into mechanical energy without, for instance, the working medium of water, as in the case of the steam locomotive. The mechanical energy thus produced is transmitted electrically to the locomotive driving axles.

On gas turbine locomotive No. 18000 a single-stage open cycle gas turbine with heat exchanger is used for the power unit, the principle being the same as has been developed by Brown Boveri for stationary power plants. The actual power unit of the locomotive consists of an axial flow compressor, a heat exchanger, a combustion chamber, and a gas turbine. The air aspirated through louvres in the side walls of the locomotive is compressed and delivered to the combustion chamber through the tubes of the heat exchanger, which are surrounded by the exhaust gases. In the combustion chamber the fuel oil is injected at high pressure, mixed with the air, and burned in a continuous flame. The hot combustion gases at a temperature of about 1,100°F. then pass to the gas turbine, where they expand, producing mechanical work, part of which is used to drive the compressor, and the rest, forming the actual nett output of 2,500 H.P., is transmitted to the generator which, in turn, is feeding the electric D.C. traction motors, one on each of the four driving axles. Before escaping through the roof of the locomotive to atmosphere, the turbine exhaust gases pass the heat exchanger, giving up part of their heat to the compressed air inside the tubes, and thus reducing the fuel consumption. The locomotive burns heavy fuel oil and uses no water, except in winter for the steam heating of the coaches.

The mechanical part of the locomotive, that is the body and bogies was made by the Swiss Locomotive & Machine Works, Winterthur. The bogies are of a new type developed by the SIM, and give the locomotive a remarkably steady riding when travelling at speeds.

Among the expected advantages of gas turbine locomotives over steam locomotives are the lower fuel consumption (about half as much fuel will be used for equal work done), the cleaner service, the absence of any water requirement, and, in particular, the greatly increased all-round availability, owing to the lack of necessity of steaming up periods and of the necessity between trips to clean fires and ash pans, etc.

Compared with Diesel electric locomotives the gas turbine locomotive should score on account of its lower maintenance and lubricating costs, of the possibility of using heavy fuel oil, the absence of water, the reduced wear and tear of the track, etc. A further important advantage is that a larger output can be accommodated within one traction unit when using gas turbines instead of Diesel motors.

A full comparison must await further operating experience, but there can be no doubt that the delivery of a gas turbine locomotive — the latest evolution in the traction field — to this country, the birthplace of Railways ,marks an important stage in the development of this new form of motive power.