

Swiss business ventures in England

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SWISS BUSINESS VENTURES IN ENGLAND.

British Brown-Boveri Limited, 75, Victoria Street, S.W.1, has on order for the Great Western Railway Company a 2,500 h.p. 90 m.p.h. Gas Turbine-Electric Locomotive. The locomotive is being designed and constructed by Brown, Boveri and Co., Ltd., Baden, Switzerland.

A similar but somewhat smaller capacity locomotive, illustrated below, was built by the same firm some five years ago for the Swiss Federal Railway. This technical achievement aroused considerable interest all over the world, as it was the first time this new form of engine was adopted for traction work. It is the only locomotive of its kind in regular service.

The principal details of the G.W.R. locomotive are as under:

Continuous nett output of the gas turbine unit	2,500 h.p.
Tractive effort at the wheel rim —	
at starting	33,000 lbs. from 0—20 m.p.h.
continuously	13,000 lbs. at 60 m.p.h. and 8,800 lbs. at 90 m.p.h.
Maximum continuous speed	90 m.p.h.
Weight in running order	about 113 tons.
Weight for braking	about 113 tons.
Adhesive weight	about 75 tons.
Length overall	65 ft. 6 ins.
Fuel	Furnace fuel oil.

Trailing weight corresponding to tractive effort of 13,000 lbs. at 60 m.p.h. is about 850 tons, but a trailing weight of 1,200 tons can be hauled at speeds up to 40 m.p.h. continuously and 50 miles intermittently.

The locomotive carries sufficient fuel for 250 miles, viz., suitable for non-stop runs from Paddington to Plymouth.

In the gas turbine-electric locomotive the heat content of the fuel oil 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.

The gas turbine unit consists essentially of: An axial flow compressor, a heat exchanger, a combustion chamber and a gas turbine. The compressor is driven by the turbine and the air which is compressed to about 45 lbs./sq.in.g. in the compressor is fed to the com-

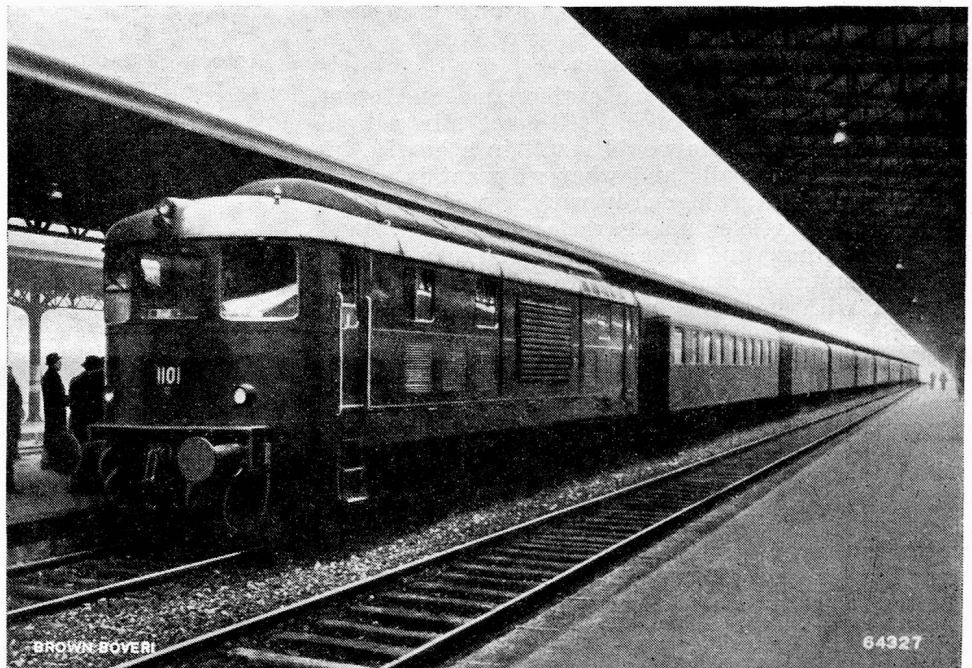
bustion chamber through the heat exchanger. In the combustion chamber the fuel oil is consumed with only a portion of this air, the remaining (much greater portion) air bye-passes the actual combustion chamber and mixes with the products of combustion in order to reduce the combustion temperature to a maximum temperature of about 1,100° F. before the turbine. This mixture of air and products of combustion is expanded through the turbine and useful work produced. The turbine exhaust gases escape to the atmosphere through the roof of the locomotive after passing through the heat exchanger. In the heat exchanger a portion of the heat in the exhaust gases is transferred to the air being delivered to the combustion chamber, the temperature of the air being thus raised to about 500° F.

At full load the turbine develops about 10,300 h.p., the compressor absorbs about 7,800 h.p. and the difference of 2,500 is transmitted to the generator set through a reduction gear.

The function of the electrical equipment is to convert the available mechanical energy produced by the gas turbine unit into electrical energy and to transmit this to the driving axles by means of electric motors.

The locomotive is carried on two six-wheel bogies, the outer axles of each bogie being driven by series type D.C. motors completely suspended to reduce the unsprung weight to a bare minimum. Driving cabs giving unobstructed look-out are at both ends as the locomotive is equally suitable for running in both directions without turning. One man control is provided, as well as standard G.W.R. safety arrangement for co-ordination with line signals.

Compared with a highly efficient express steam locomotive, such as is at present being used on the Great Western line, the fuel consumption of the gas turbine-electric locomotive will be less than half for equal work done.



Swiss Federal Railways 2,200 h.p. Gas Turbine Electric Locomotive at the Gare de l'Est, Paris.