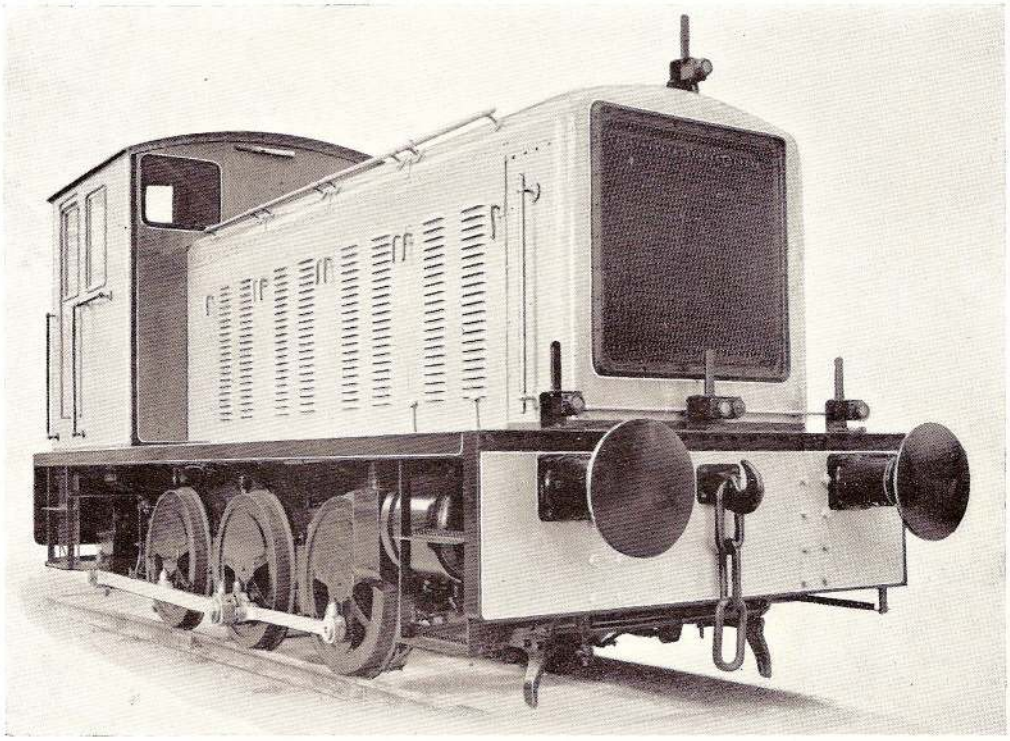
204 B.H.P. DREWRY DIESEL MECHANICAL 0-6-0 LOCOMOTIVE.

(Built in conjunction with the Drewry Car Company Ltd.).

Various Gauges.



204 B.H.P. Drewry Diesel Mechanical 0-6-0 Locomotive.

IN view of the outstanding success achieved by the 153 B.H.P. 0-4-0 units built in conjunction with the Drewry Car Co. Ltd., and described on page 32, it was decided that a somewhat larger and more powerful Locomotive should be designed on similar lines, but incorporating an 0-6-0 wheel arrangement and a 204 h.p. engine.

This Locomotive can now be supplied for gauges of 1 metre (1,000 mm.), 3 ft. 6 in. (1,067 mm.), 4 ft. 8½ in. (1,435 mm.) and 5 ft. 6 in. (1,676 mm.), the first two categories having outside frames and the latter two inside frames. They are of robust design with the vehicle based on Steam Locomotive practice with axleboxes of cast steel and gunmetal or phosphor bronze inserts.

At the time of going to press orders are in hand as follows :—

METRE GAUGE (1,000 mm.) :—

TANGANYIKA : Tanganyika Railway	3	Locomotives

3 ft. 6 in. GAUGE (1,067 mm.) :—

ALGERIA : Colomb Béchar Coal Mines...	2	,,
TASMANIA : Tasmanian Government Railways	4	,,
NEW ZEALAND : Ohai Railway Board...	1	,,
New Zealand Government Railways	4	,,
Wakatane Paper Mills	1	,,
SOUTH AFRICA : Whites S.A. Portland Cement Co. ...	1	,,

4 ft. 8½ in. GAUGE :—

GREAT BRITAIN : L.N.E. Railway	1	,,
Northern Aluminium Co.	2	,,
ALGERIA : Colomb Béchar Coal Mines...	2	,,

5 ft. 6 in. GAUGE (1,676 mm.) :—

PORTUGAL : Portuguese State Railways	6	,,

DIMENSIONS : The principal dimensions of these Locomotives, subject to any minor modifications which may be necessary for specific orders, are as follows :—

Gauge	**METRE**	**3 ft. 6 in.**	**4 ft. 8½ in.**	**5 ft. 6 in.**
Wheel Diam.	3 ft. 3 in. (991 mm.)			
Wheelbase	9 ft. 0 in. (2743 mm.)			
Overall Length	27 ft. 6 in. (8381 mm.)	27 ft. 6 in. (8381 mm.)	25 ft. 9 in. (7848 mm.)	25 ft. 9 in. (7848 mm.)
Length over Buffer Beams	22 ft. 6 in. (6857 mm.)	22 ft. 6 in. (6857 mm.)	22 ft. 6½ in. (6870 mm.)	22 ft. 6½ in. (6870 mm.)
Overall Width	8 ft. 0 in. (2438 mm.)	8 ft. 6 in. (2590 mm.)	8 ft. 6 in. (2590 mm.)	8 ft. 6 in. (2590 mm.)
Height above Rail	11 ft. 3 in. (3429 mm.)	11 ft. 6 in. (3505 mm.)	12 ft. 2 in. (3708 mm.)	12 ft. 2 in. (3708 mm.)
Fuel Capacity	150 gallons (681 Litres)			
Max. Axle Load	9 tons app.	9 tons app.	10 tons app.	11 tons app.
Weight in Work'g Order	26½ tons app.	26½ tons app.	28 tons app.	30½ tons app.
Max. T.E. under normal conditions :—				
Final Drive 8.47 : 1	14680 lbs. (6659 Kgs.)			
Final Drive 9.83 : 1	16900 lbs. (7666 Kgs.)			

ENGINE : The Engine is of the cold starting, airless injection 8L3 type constructed by Messrs. Norris, Henty & Gardner Ltd., of Patricroft, Manchester, and has 8 cylinders in line, 5½ in. (140 mm.) bore by 7¾ in. (197 mm.) stroke. This engine has a swept volume of 24.1 litres, an idling speed of 330 r.p.m., and develops a B.H.P. of 204 at the maximum governed speed of 1,200 r.p.m.

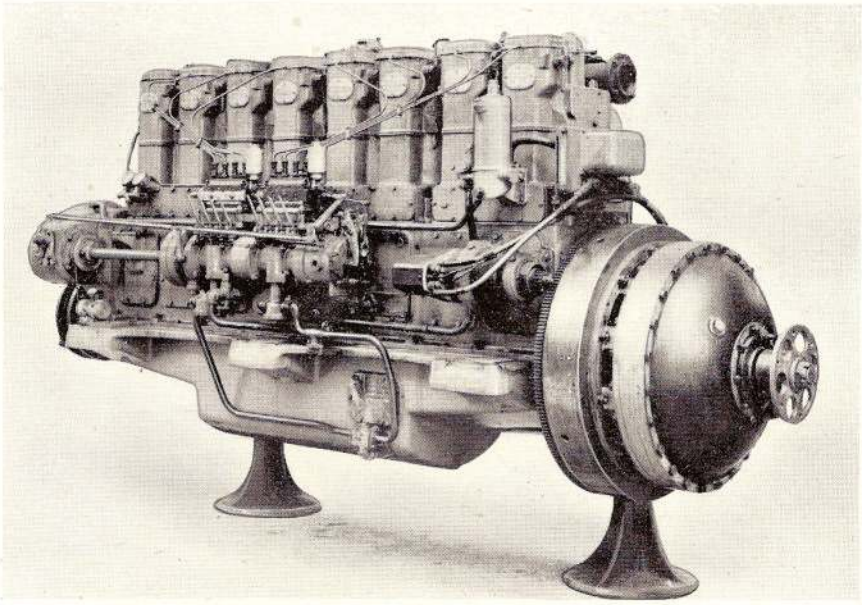
The cylinders are in pairs with renewable liners and each cylinder head is separate and detachable, with one inlet and one exhaust valve actuated by push rods and enclosed rockers.

A Gardner C.A.V. fuel pump controlled by a variable speed Governor is employed for fuel injection, the sprayers being of the multi-hole type.

Lubrication is forced throughout to all engine bearings including connecting rod small ends, and special double interconnected oil pumps are fitted for circulating the oil through the external oil radiator.

Starting is by means of two C.A.V. 24 Volt axial type electric starters engaging with a toothed ring on the engine fly wheel; no heater plugs or other external adjuncts are required.

A large capacity vertical radiator mounted beneath the forward end of the engine housing is provided for cooling purposes, one section of which is reserved for cooling the lubricating oil. The radiator is assisted by a powerful engine-driven fan and centrifugal pump and the whole cooling system is thermostatically controlled.



An 8L3 Type Gardner Engine.

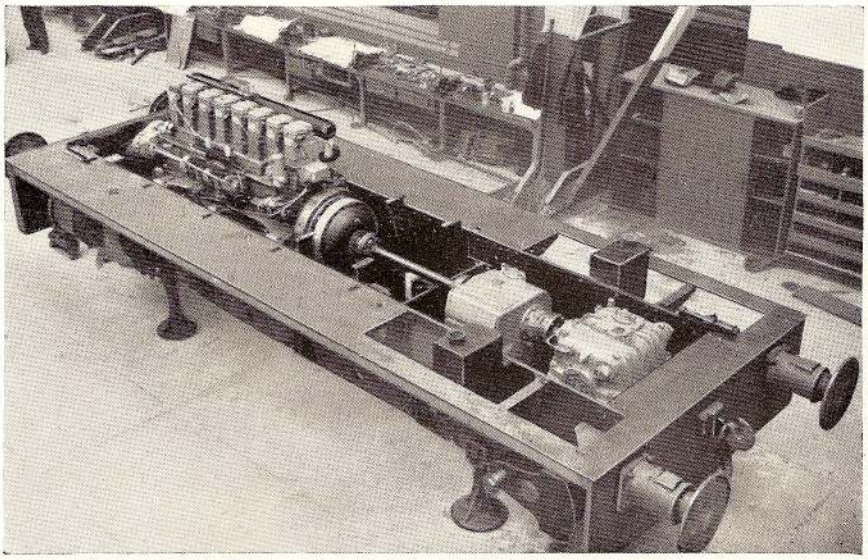
TRANSMISSION : The transmission consists of a Vulcan-Sinclair rigid traction type fluid coupling, a Wilson-Drewry 5-speed epicyclic C.A. type gearbox manufactured by the Self-Changing Gear Co. Ltd., reverse and reduction gears, jackshaft, and driving and coupling rods.

The fluid coupling is capable of transmitting full engine B.H.P. at maximum r.p.m. with a slip of about $2\frac{1}{2}\%$. It takes up all starting slip, absorbs shock and torsional vibrations and renders it impossible for the driver to stall his engine as a result of overloading or mismanagement.

The epicyclic gearbox has ratios of 4.07, 2.33, 1.55 and 1 to 1 with a fifth or overspeed gear of 1 to 1.87. As the Locomotive can be supplied with either of two overall ratios in the final drive, viz., 8.47 or 9.83 to 1, the above gearbox ratios will give two sets of road speeds, and these are as follows at the maximum of 1,200 r.p.m.

RATIO	1st GEAR	2nd GEAR	3rd GEAR	4th GEAR	5th GEAR
8.47 : 1	3.9 m.p.h. (6.3 k.p.h.)	6.9 m.p.h. (11.1 k.p.h.)	10.2 m.p.h. (16.4 k.p.h.)	15.9 m.p.h. (25.6 k.p.h.)	29.8 m.p.h. (48 k.p.h.)
9.83 : 1	3.4 m.p.h. (5.5 k.p.h.)	5.9 m.p.h. (9.5 k.p.h.)	8.8 m.p.h. (14.2 k.p.h.)	13.7 m.p.h. (22 k.p.h.)	25.6 m.p.h. (41.2 k.p.h.)

Particularly high efficiency, long life and silent operation are obtained from this type of gearbox due to the low stresses on the gear teeth and planet bearings, and slow speeds of tooth engagement. Ball and roller bearings are used throughout in the gearbox running gear and lubrication is under pressure from a positive plunger pump in the gearbox itself.



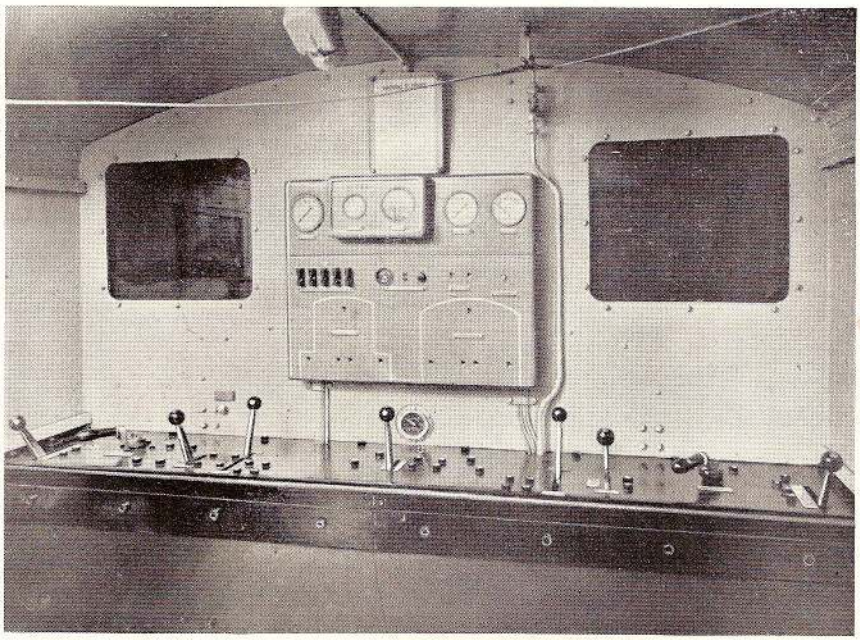
Frames showing Engine and Transmission Layout.

The epicyclic brake bands work in oil and completely encircle the drums ; they are self-centring and adjustment for wear is effected automatically. Gear engagement is carried out pneumatically by a series of air cylinders embodied in the gearbox and connected to each band assembly, admission of air to the cylinders being made through a simple disc valve. Changes of speed are thus made practically instantaneously with a minimum of effort or skill on the part of the driver.

The spiral bevel reverse gear and the reduction gears are contained in a single cast steel case of robust design, the reduction gears to the jackshaft being case hardened nickel steel, ground to ensure silence and mounted on nickel steel shafts carried in roller bearings. The jackshaft which carries the reverse unit is itself housed in large plain bearings lined with white metal.

Two resilient couplings are also fitted between engine and gearbox and between gearbox and final drive to permit of frame flexing.

CONTROLS : The main controls in the driver's cab consist of the engine speed control, change speed control, reversing handle and driver's brake valve, all these being duplicated on either side. The change speed and reversing controls are interlocked to prevent operation of the reversing handle until the change speed has been put in the neutral position. Engine starter and stop buttons, sanding gear, and a screw hand brake are also provided.



View of Interior of Cab.

ACCESSORIES AND EQUIPMENT : The air service for gear changing, braking and sanding is provided by an engine-driven Westinghouse reciprocating compressor. A Westinghouse straight air brake with self-lapping brake valve affords the braking power, but if the locomotive is required to operate with vacuum-braked stock, an engine-driven exhauster is also provided together with a vacuum-operated straight air application valve controlling the air brake on the Locomotive itself.

Other fittings worthy of mention are the air-operated whistle, C.A.V. 24 volt engine-driven generator, starter motor, and large capacity lead acid battery. All the necessary instruments and gauges are provided on the control panel, and electric lighting can be fitted according to requirements.