DIESEL LOCOMOTIVE ENGINES.

In a lecture delivered before many of the engineering societies in the United States, Dr. Rudolf Diesel goes into the present status of the Diesel engine in Europe. One of the most interesting parts of his address is that dealing with the Diesel engine, as applied to the railroad locomotive. The following is an abstract of that section of the paper:

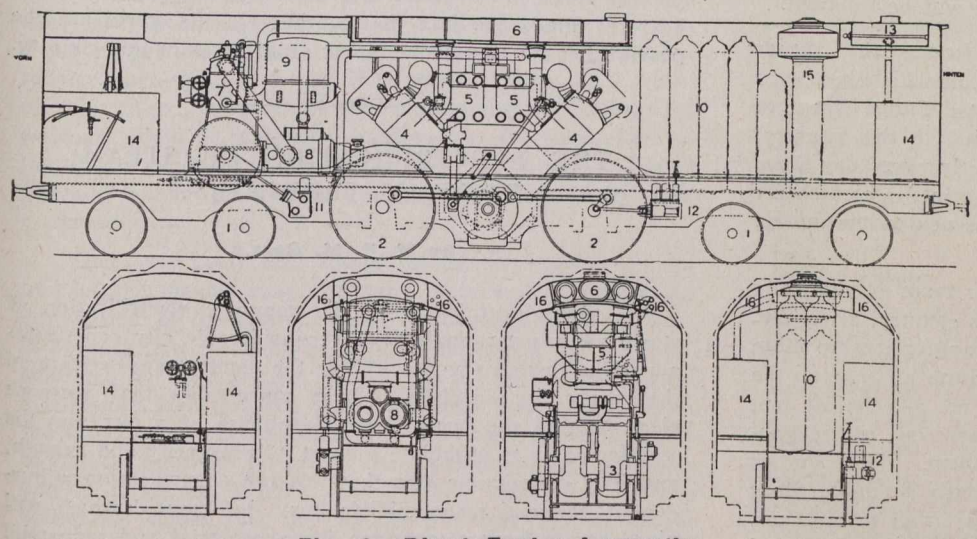

Fig. 1.—Diesel Engine Locomotive.

Of the Diesel locomotive nothing has as yet been published, and it gives the author a special pleasure to give a description of the first Diesel locomotive ever built, in this country of mighty oil wells and gigantic railways. From the early days of his invention the author was of the opinion that the special features of the Diesel engine would be of even greater importance for transport purposes than for stationary work, and, for that reason, the author devoted his time extensively to the development of the engine as motive power for transportation mediums. The author has already mentioned that he made the first small ship engine in 1902, and that since that time, the Diesel marine engine has been developed without interruption. The author further mentioned that he made the first automobile engine for trucks in the year 1909, and that he looks forward to the development of this branch within a few years. Finally, the author has to say, that he has worked for five years, together with Messrs. Sulzer Bros., at Winterthur, and Mr. Adolf Klose, of Berlin, on the construction of a Diesel locomotive, and that the first express train locomotive of 1,000 to 1,200 horse-power was finished a few weeks ago, and is now on the testing bed in the Winterthur shops. Five years is a very long time, and to explain why the work has lasted that long, the author must mention that the thermo-locomotive is the most difficult problem of construction that can be taken up in the way of modern engine building, not only on account of the difficulties in starting and manoeuvring with this special kind of motor, but also on account of the great limitations in space and weight. Compared with this, the development of the reversing marine motor has been relatively simple. Fig. 1 shows the design of this locomotive, the car of which was made in the renowned locomotive works of A. Borsig, at Berlin. It is 16.6 metres long over the buffers, and has two trucks of two axles each, 1-1, and two driving wheels, 2-2. The latter are not directly coupled with the engine, but indirectly with the blind axle (3) which is, at the same time, the crank shaft of the Diesel engine (4).

The Diesel engine is an ordinary two-stroke cycle engine, with four cylinders (4–4) coupled in pairs at an angle of 90°, and which drives the blind axle (3–3), whose cranks form an angle of 180° (see III–III). This disposition gives complete balancing of the moving masses, the first and most important condition when putting such engines on a movable platform. Between the working cylinders are placed two scavenging pumps (5) driven by levers from the connecting rod. Beyond the engine in the roof of the car is placed the silencer (6). On one side of the main engine stands an auxiliary engine (7). This latter consists of two vertical two-stroke cycle cylinders (7–7) coupled to horizontal air pumps (8–8) driven by these cylinders (see II–II). 9 indicates the cooler for the air compressed by these pumps. These air pumps serve, according to a special and patented process, to increase the power of the main engine when starting, manoeuvring and going up-hill, in such a way that auxiliary compressed air and auxiliary oil-fuel are conducted into the main cylinder, by which means the power is increased, making the engine as elastic as the steam engine. For the ordinary running of the locomotives, the main cylinders work like ordinary Diesel engines without the help of auxiliaries. To the right of the main engine is placed a battery of air bottles (10), the air from which helps the action of the auxiliary engine, and which can be refilled by the auxiliary engine at times when the latter is not used. Two pumps (11–12) provide for the water circulation in the cylinder jacket. 13 indicates an apparatus for the back-cooling of the water by evaporation, and 14, the tanks for fresh water and for fuel (see sections II–II and IV–IV). 15 is a small donkey boiler for the heating of the train.

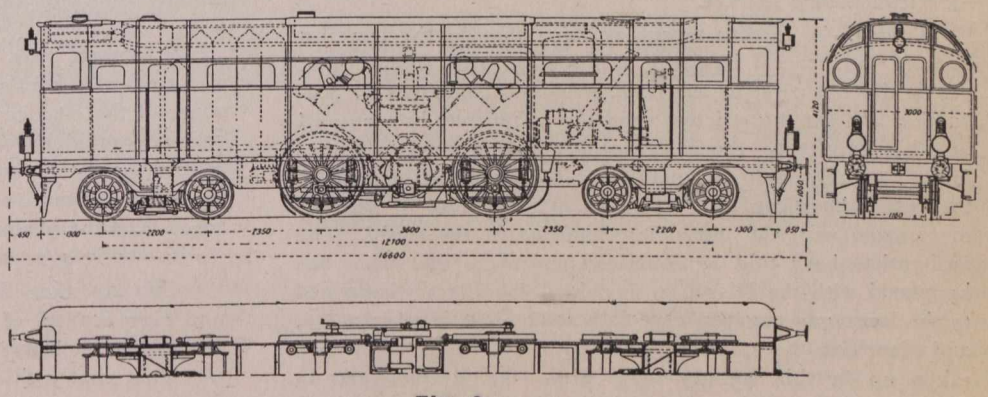

Fig. 2.

The whole plant is contained in a closed engine room which makes the locomotive look from the exterior like one of your steel cars. The canals (16) under the roof lead the fresh air to the suction pipes of the different motor and pump cylinders. The engineer can operate equally well on either side of the locomotive, as the engine is arranged for