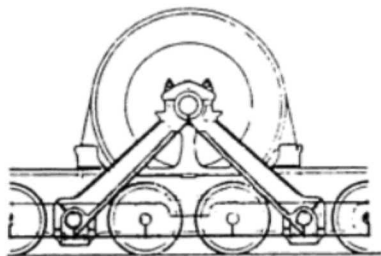
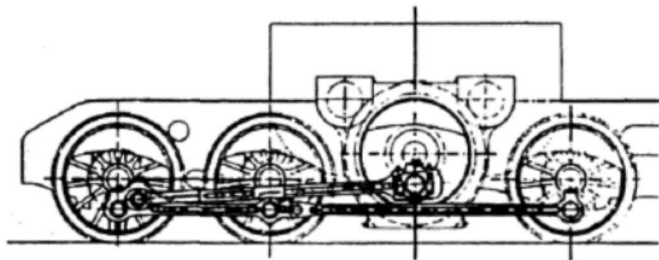


unity transmission, the complete motor assembly was very heavy (example  $G = 24$  metric tons, outer diameter 3,6 m (~12 ft)).

During the Great War, gearings of 1 MW rating became possible. Fig. 3.5 shows the Winterthur “inclined driving rod” system with primary gear transmission, which was developed by the Swiss Locomotive Factory (SLM) of Winterthur in 1922 for the 2<sup>nd</sup> series of “Krokodil”- type locomotives.



*Fig. 3.4: Parallel-crank drive  
KPEV 1914 Fig.*



*3.5: Winterthur inclined rod drive with primary gear 1922*

Two drive motors provide torque via a primary gear transmission of about 1:3 to an intermediate driving axle which is mounted slightly higher than the driving wheelsets. It drives the outer drive wheelset via slightly inclined oblique driving rods, the inner wheelsets being driven by coupling rods from the outer sets. This system was used for slow locomotives of high tractive force until the 1960s; for example, the heavy “Dm” locomotives of the Lulea-Kiruna-Narvik iron-ore railway were equipped with this kind of drive.