

that all the axles of the locomotive are driven and all the wheels are drive-wheels, and that the speed with which they are driven can be changed by operating the worm - shaft I² without changing the speed of the engines. This is important, for when it is necessary to ascend a grade or draw an extra load the engineer can so shift the gears that the locomotive will run slow, while the engines may run at such speed as to develop their maximum power.

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What I claim as new is—

1. In a locomotive, the combination, with the engines and crank-shaft C¹, moved by said engines, of the sliding sleeve E on said shaft, means for moving said sleeve, the gears E' E² of different diameter on said sleeve, the counter-shaft G, the gears H and H' on said shaft, adapted, as shown, to consort, respectively, with the gears E' and E², the gear F³ on said counter-shaft, the gear F² on the main-line shaft D, the gears F' on said main shaft in proximity to the axles, and the gears F on said axles, which gear with the gears F'.

2. In a locomotive, the combination, with the engines, of the crank-shaft C¹, the counter-shaft G, parallel with said crank-shaft, gearing for operating said counter-shaft from said crank-shaft at different speeds, a main-line shaft at right angles to said crank-shaft and counter-shaft and the axles of the wheels, which is located midway between said wheels, gearing on said counter-shaft for communicating power from the former to the latter,

and gearing on said main shaft and said axles for communicating power from the former to the latter.

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3. In a locomotive, the combination, with the engines, of a crank-shaft C¹, a counter-shaft parallel with said crank-shaft, a sliding sleeve E on said crank-shaft, a shifter for moving said sleeve, a screw-shaft for moving said shifter, gearing for moving said shaft, which is operated from the cab, gears of different diameter on said sleeve and on said counter-shaft, whereby the speed of said counter-shaft may be made greater or less than said crank-shaft, a main-line shaft, gearing for moving the same from said counter-shaft, and gearing on said main shaft and the axles for moving said axles from the main shaft.

4. In a locomotive, the combination of engines located on the sides of the boiler at the front end, a crank-shaft located below the boiler back of the engines, a counter-shaft parallel with the crank-shaft and below the same, a main driving-shaft located midway between the wheels below the counter-shaft and at right angles to the same, gearing for moving the counter-shaft, and gearing for moving the main shaft from the counter-shaft.

In testimony whereof I affix my signature in presence of two witnesses.

RUSH S. BATTLES.

Witnesses:

JNO. K. HALLOCK,
WM. P. HAYES.