

wheels; and means for freeing the idle wheels when the ordinary driving wheels are lowered to drive.

5 5. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; a tender provided with normally idle wheels; means for lowering the supplemental wheels to raise the driving wheels; means for driving the supplemental wheels and idle wheels from the ordinary driving wheels; and means for freeing the idle wheels when the ordinary wheels are lowered to drive.

15 6. A locomotive provided with ordinary driving wheels and normally idle wheels; a tender provided with normally idle wheels; means for driving the idle wheels from the ordinary driving wheels; and means for freeing either sets of wheels at will.

20 7. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; a longitudinal shaft geared to the axles of the idle wheels and the supplemental wheels; a telescopic universal joint in the said shaft between the supplemental wheels and the idle wheels; means for lowering the supplemental wheels to raise the driving wheels; means for driving the supplemental wheels; and means for freeing the idle wheels from their drive when the ordinary driving wheels are lowered to drive.

35 8. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; a tender provided with normally idle wheels; a longitudinal shaft geared to the axles of the idle wheels and the supplemental wheels; telescopic universal joints in the said shaft between the supplemental wheels and the idle wheels; means for lowering the supplemental wheels to raise the driving wheels; means for driving the supplemental wheels; and means for freeing the idle wheels from their drive when the ordinary driving wheels are lowered to drive.

45 9. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; means for lowering the supplemental wheels to raise the driving wheels; means for driving the supplemental wheels and idle wheels; and means for freeing the idle wheels when the ordinary driving wheels are lowered to drive.

55 10. A locomotive provided with ordinary driving wheels; supplemental wheels; side rods connecting the wrist pins of the driving wheels; and connecting rods each pivotally connected to a supplemental wheel and one of the side rods. Geared Steam Locomotive Works

60 11. A locomotive provided with ordinary driving wheels; supplemental wheels vertically and longitudinally movable; journal boxes for the axles of said wheels; side rods connecting the wrist pins of the said driving wheels; connecting rods each pivotally connected to a supplemental wheel and one of

the side rods adjacent to one of the ordinary driving wheels; and means connected with said journal boxes for maintaining a constant distance between the centers of the supplemental wheel and the said driving wheel. 70

12. A locomotive provided at each side with ordinary driving wheels and springs therefor; supplemental wheels vertically movable; an equalizer system connected with the springs and with the frame of the locomotive; and means connected with the equalizer system for raising and lowering the supplemental wheels. 75

13. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; means for driving either by the ordinary driving wheels or by the supplemental wheels; and means for gearing the idle wheels to the supplemental wheels when the latter are driving. 80

14. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; means for driving either by the ordinary driving wheels or by the supplemental wheels; a longitudinal shaft geared to the axles of the supplemental and the idle wheels; a telescopic universal joint in the said shaft between the supplemental wheels and the idle wheels; and means for freeing the idle wheels from their drive when the ordinary driving wheels are driving. 85

15. A locomotive provided with ordinary driving wheels; normally idle wheels; supplemental wheels; a tender provided with normally idle wheels; means for driving either by the ordinary driving wheels or by the supplemental wheels; a longitudinal shaft geared to the axles of the supplemental and the idle wheels; telescopic universal joints in the said shaft between the supplemental wheels and the idle wheels; and means for freeing the idle wheels from their drive when the ordinary driving wheels are driving. 100

16. A locomotive provided with driving wheels; a plurality of pairs of normally idle wheels; a longitudinal shaft between the axles of said idle wheels geared to said axles by bevel gearing; a longitudinal shaft passing over the axles of the idle wheels; gearing between the axle of the driving wheels and said shaft; and gearing between said shaft and the first mentioned shaft. www.gearedsteam.com 110

17. A locomotive provided with ordinary driving wheels; supplemental wheels vertically and longitudinally movable; journal boxes for the axles of said wheels; side rods connecting the wrist pins of the said driving wheels; connecting rods each pivotally connected to a supplemental wheel and one of the side rods adjacent to one of the ordinary driving wheels; links each parallel to and of the same length as one of the connecting rods, and suitably connected with the said journal boxes to form with the said connecting rods parallel-motion devices tending 120 125 130