Jan. 4, 1944. C. K. STEINS 2,338,212

LOCOMOTIVE

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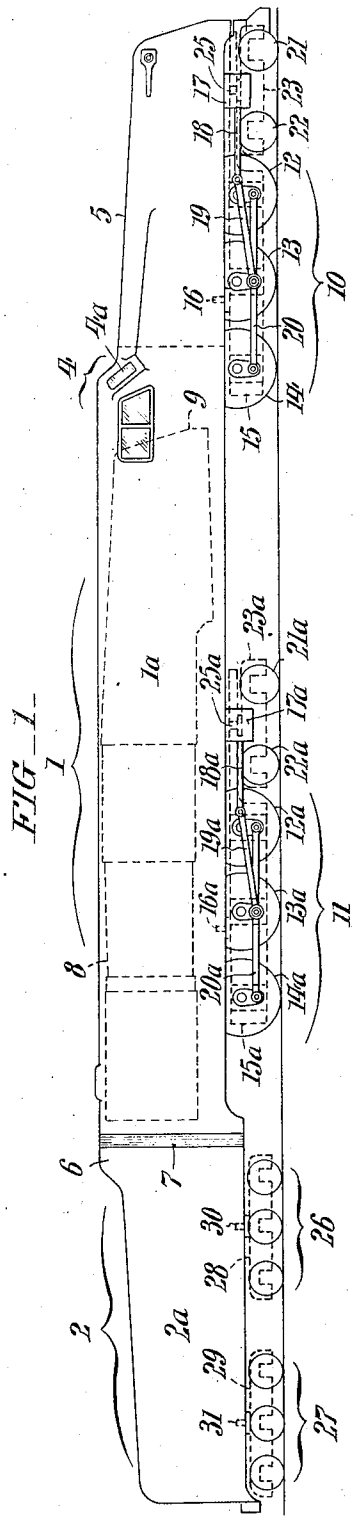


FIG. 1.

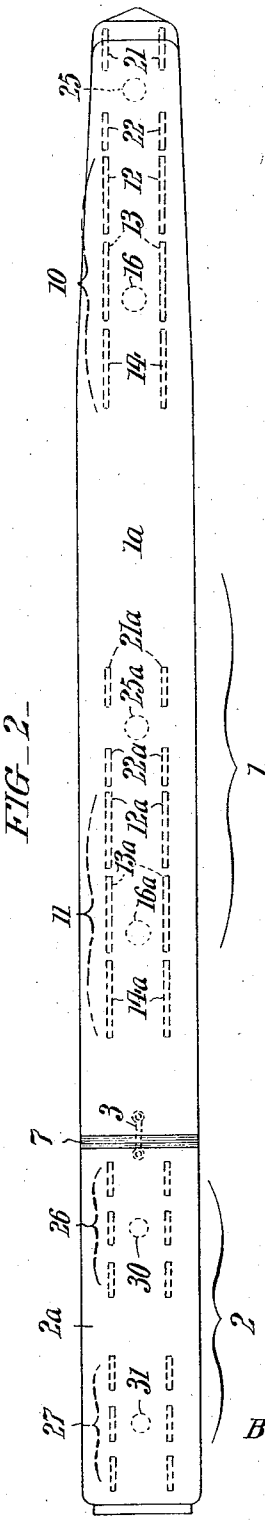


FIG. 2.

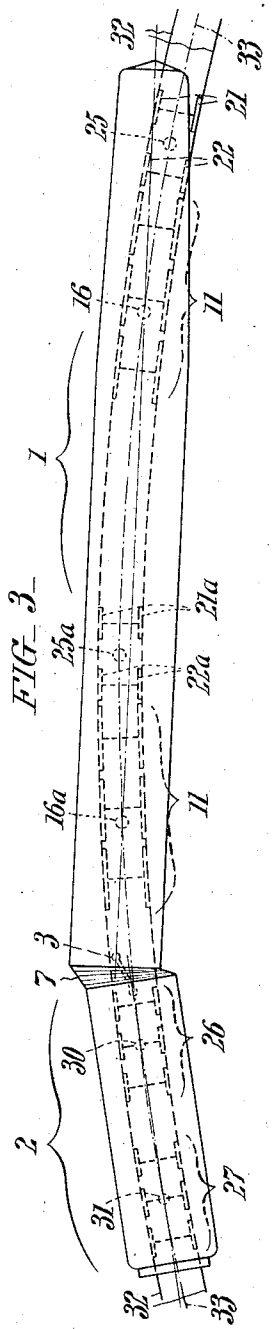


FIG. 3.

INVENTOR:
Carleton K. Steins,
BY Paul & Paul
ATTORNEYS.

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LOCOMOTIVE

Carleton K. Steins, Merion, Pa., assignor to The Pennsylvania Railroad Company, Philadelphia, Pa., a corporation of Pennsylvania

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4 Claims. (Cl. 105—175)

This invention relates to locomotives, and has reference more particularly to steam locomotives driven either by reciprocatory or rotary (turbine) engine units.

My invention has for one of its aims to increase the tractional or pulling power of steam locomotives by more fully making use of the total weight of the engine and the fuel and/or water load. This objective I attain in practice as hereinafter more fully disclosed, by providing for carriage of the boiler and the fuel (or water) supply at opposite ends of a single chassis or body, and by supporting such chassis or body on a pair of power trucks disposed respectively beneath the boiler and the fuel supply so that the respective weight loads are communicated in approximately equal proportions to the drivers of such units.

Another object of my invention is to enable a locomotive structure organized as above, notwithstanding its increased length over that of ordinary locomotives, to readily round track curves at high speeds without restriction of the vision ahead of the engine crew. This advantage is in turn realized in practice likewise as hereinafter more fully pointed out, through swivelling of the power units relative to the body in such a manner that the points of load concentration are kept on the track center, and that the ends and the mid-portion of the body respectively extend with minimum projection beyond the center line of the track.

Another object is to facilitate ash discharge from the boiler and also to enable use of an ash pan of maximum capacity, which desiderata are attained through my invention by so spacing the power units at opposite ends of the locomotive body as to provide a liberal interval between them, and by arranging the boiler so that its fire box end is directly over such interval.

Other objects and attendant advantages will appear from the following detailed description of the attached drawing, wherein

Fig. 1 is a view in side elevation showing, more or less diagrammatically, a steam locomotive conveniently embodying my invention.

Fig. 2 shows the top plan view of the locomotive; and

Fig. 3 is likewise a plan view showing the positions assumed by the component sections of the locomotive on a curve in the railway track.

As herein illustrated, my improved locomotive comprises a main section 1, and a trailer section 2, said sections being in this instance coupled by means of a draw bar 3 (Fig. 2), although, for this purpose, an ordinary coupler may be employed instead if this should be found advantageous or desirable in practice. The chassis or body 1a of the main section 1 is continuous, and the front thereof in advance of a compartment 4 provided for the locomotive crew is tapered in plan as shown in Fig. 2 and has its top depressed and inclined at a gentle downward slope as at 5. As shown, the crew compartment is provided with windows 4a which overlook the depressed forward end of the main body. The body 2a of the trailer unit 2 is shaped generally like the forward portion of the main body 1a, and has a front end portion 6 of a height equal to that of the contiguous rear end of said main body, the intervening gap allowed for articulation between the two sections being closed by a bellows insert 7. As a consequence of the described construction and proportioning, the locomotive as a whole takes on an attractive symmetrically-balanced stream-lined appearance when viewed from the side as in Fig. 1.

Housed within the rear end portion of the body 1a of the main section 1 is a horizontal steam boiler 8, which, in the illustrated instance, is reversely arranged from the standpoint of customary practice, i. e., with its fire box 9 forward and positioned substantially mid-way of the two supporting drive units 10 and 11 so that there is nothing in the way of direct downward discharge of the ashes therefrom. With the boiler arranged as described, the front end of the main body 1a is utilized as a compartment for fuel storage, and the body 2a of the trailer 2 as a compartment for storage of replenishing water for the boiler. When coal is used for fuel, a suitable stoker means may be installed for conveying it as required into the fire box 9 of the boiler 8.

The powered drive units 10 and 11 are identical both as regards their design and their arrangement relative to the body of the main section 1, and I will therefore confine the description for the time being to the forward one of the two. As shown, the unit 10 has three pairs of driving wheels 12, 13 and 14 whereof the axles are journaled in a frame 15 which is swivelly connected to the body 1a for pivotal movement at 16. At its front end and at each side of the locomotive, the frame 15 carries the steam cylinder 17 of a reciprocating engine having its piston rod 18 coupled, by means of a main driving rod 19, with the crank pin of the middle driver 13, the drivers 12—14 being coupled for unison rotation by a parallel rod 20. The auxiliary truck directly ahead of the forward driver 12 has smaller fore and aft wheels 21 and 22 centralized with respect

to the cylinder 17, and its frame 23 swivelled centrally for independent pivotal movement relative to the frame 15 at 25. Since the rear powered driving unit 11 is identical with the front one as before pointed out, its component parts have been identified with the same reference numerals except for the addition in each instance of the letter *a* for convenience of ready distinction. It is of course to be understood that within the scope of the appended claims turbine engines may be employed in lieu of the reciprocating type of engine illustrated herein, if this should be found to be more advantageous or desirable in practice.

As another alternative, the arrangement of the boiler may be reversed (fire box to the rear) within the body 1*a* of the main section, the front compartment 5 utilized for water storage, and the body 2*a* of the trailer 2 utilized for fuel storage.

The body of the trailer 2 is supported by a pair of six-wheeled trucks 26, 27 whereof the frames 28, 29 are connected on centers to the trailer adjacent its ends for independent swivelling movement at 30 and 31.

It is to be particularly noted that the individually powered drive units 10 and 11 are well spaced to provide room between them for a boiler ash pan of maximum size, and also to permit direct downward discharge of the ashes from said pan. It will moreover be observed that the pivots 16 and 16*a* for the drive units 10 and 11 are well rearward of the longitudinal centers of the main truck frames 15 and 15*a* being actually located at a point between the axles of the rearmost pairs of drivers 13, 14, and 13*a*, 14*a*; while the pivot connections 25, 25*a* are central of the auxiliary small-wheeled advance trucks. As a consequence of this, the body of the main unit 1 of the locomotive will take the position shown in Fig. 3 in rounding curves in a railway track 32, with the front and rear ends and the mid-region of the body swung out to comparatively short but approximately equal distances beyond opposite sides of said track. Under these circumstances and by reason of the fact that the boiler and fuel loads are concentrated on the pivots 16 and 16*a* which remain on the track center (indicated by the curved dot-and-dash line 33 in Fig. 3), the unit is stabilized or maintained in balance so that the curves can be readily negotiated. The load distribution due to the described allocation of the pivots 16 and 16*a* at the locations shown has the further advantage of insuring the most effective adhesion between the drivers of the power units 10 and 11 and the track rails, to the end that the maximum driving effect is attained. The small wheels 21, 22 and 21*a*, 22*a* of the auxiliary trucks, by virtue of being in the lead of the drivers of the respective power units 10 and 11 cooperate to guide the drivers of said units. Since both trucks 26 and 27 of the trailer unit 2 are centrally pivoted to the trailer body 2*a*, track curves are followed without any difficulty whatever, the coupling at 3 and the bellows connection at 7 allowing for the lateral displacement of the rear end of the main unit relative to the contiguous end of said trailer in a manner which will be readily understood from Fig. 3.

Having thus described my invention, I claim:

1. In a steam locomotive, a body having at its front end, a storage compartment for fuel or water and housing in its other end an elongate horizontal boiler with the fire box thereof forward; and independently swiveled steam-powered trucks respectively beneath the storage compartment and the boiler, the pivotal connections for said trucks being so allocated that the extents of front and center overhang of the body beyond opposite sides of the track will be substantially equal during rounding of curves by the locomotive, and each such truck comprising a journal frame with plural pairs of drivers, and an auxiliary wheeled truck pivoted to said frame forward of said drivers with capacity for independent swiveling movement.

2. In a steam locomotive, a body having at its front end, a storage compartment for fuel or water and housing in its other end an elongate horizontal boiler with the fire box thereof forward; and independently swiveled steam-powered trucks respectively beneath the storage compartment and the boiler, the pivotal connections being rearward of the transverse centers of the respective trucks and so allocated that the extents of front and center overhang of the body beyond opposite sides of the track will be substantially equal during rounding of curves by the locomotive, and each such truck comprising a journal frame with three pairs of drivers, and an auxiliary wheeled truck pivoted to said frame forward of said drivers with capacity for independent swiveling.

3. In a steam locomotive, a body having at its front end, a storage compartment for fuel or water and housing in its other end an elongate horizontal boiler with the fire box thereof forward; and independently swiveled steam-powered trucks respectively beneath the storage compartment and the boiler, the pivotal connections for said trucks being so allocated that the extents of front and center overhang of the body beyond opposite sides of the track will be substantially equal during rounding of curves by the locomotive, and each such truck comprising a journal frame with three pairs of drivers, with its swivel pivot disposed in a transverse plane between the two rear pairs of the drivers, and an auxiliary truck with two pairs of smaller wheels pivoted to said frame forward of said drivers with capacity for independent swiveling movement.

4. In a steam locomotive, a body having at its front end, a storage compartment for fuel or water and housing in its other end an elongate horizontal boiler with the fire box thereof forward; and independently swiveled steam-powered trucks respectively beneath the storage compartment and the boiler, the pivotal connections for said trucks being so allocated that the extents of front and center overhang of the body beyond opposite sides of the track will be substantially equal during rounding of curves by the locomotive, and each such truck comprising a journal frame with plural pairs of drivers, an auxiliary truck with two pairs of smaller wheels pivoted to the frame forward of the drivers with capacity for independent swiveling movement, and actuating cylinders for said drivers mounted on said frame respectively at opposite sides of the locomotive in the plane of the pivot for said auxiliary truck.

CARLETON K. STEINS.