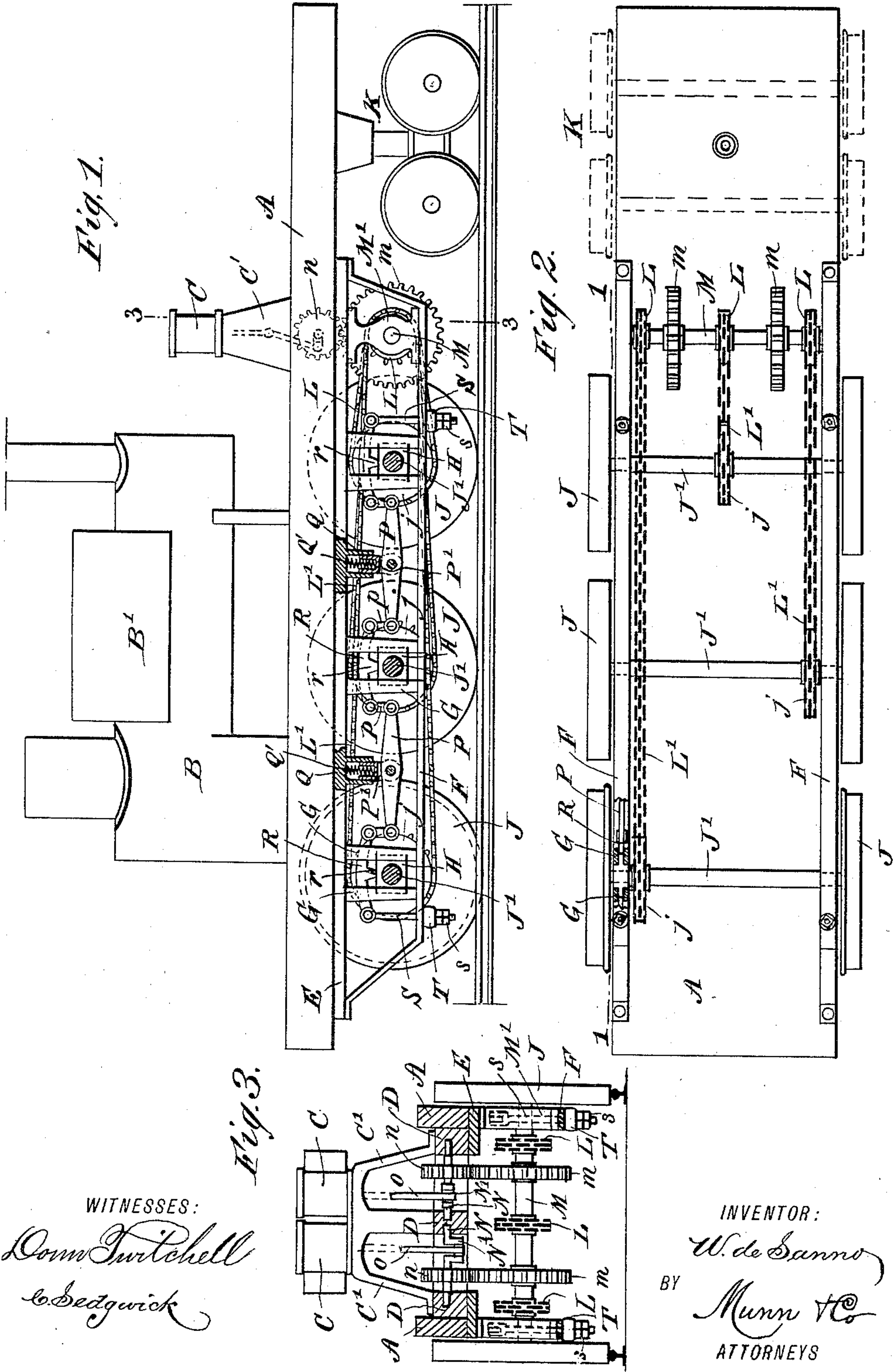


(No Model.)

W. DE SANNO.  
TRAM ENGINE.

No. 453,092.

Patented May 26, 1891.





# UNITED STATES PATENT OFFICE.

WALTER DE SANNO, OF CORRY, PENNSYLVANIA.

## TRAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 453,092, dated May 26, 1891.

Application filed September 13, 1890. Serial No. 364,821. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER DE SANNO, of Corry, in the county of Erie and State of Pennsylvania, have invented a new and Improved Tram-Engine, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of tram-engines which are operated by driving-chains; and the object of my invention is to produce a tram-engine of simple construction in which the counter-shaft from which power is taken to turn the driving-axes is on a horizontal line with said driving-axes, thereby avoiding all strain on the driving-chains when the wheels drop into low places on the track; and a further object of the invention is to arrange the equalizing-bars which support the engine in such a manner that the weight of the engine will be equally distributed on the driving-wheels regardless of the condition of the track.

To this end my invention consists in certain features of construction and combinations of parts, which will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical longitudinal section of the engine, taken on the line 1 1 in Fig. 2, and showing the main portion of the same in side elevation. Fig. 2 is an inverted plan of the same with a portion broken away to show the bifurcated jaws which carry the axle-boxes, and Fig. 3 is a vertical cross-section on the line 3 3 of Fig. 1.

The horizontal frame A is mounted upon suitable wheels, as described below, and carries a boiler B, having a suitable tank B', and mounted on the frame in front of the boiler are the cylinders C, which are fixed to the support C', said support resting on the bed D, which is supported in the frame A.

My invention relates chiefly to the driving mechanism and the equalizing devices, as described below, and I have not shown the driving-engine and cylinders in detail, as any approved form of driving-engine may be used.

On the under portion of the frame A and on each side is bolted a longitudinal strip E, and a brace F extends longitudinally beneath

and parallel with each strip E, the braces F being bent at the ends to connect with the strips E, as best shown in Fig. 1. Arranged at equal distances between the strips E and the braces F are the vertical jaws G, which carry the driving-boxes H, the said jaws being bifurcated to permit the boxes H to move vertically therein and to permit the equalizing-yokes to pass through them, as described below.

The engine is provided with suitable driving-wheels J, there being three on each side, and the driving-wheels are provided with suitable axles J', which turn in the axle-boxes H. The forward portion of the frame A, which extends in front of the driving-wheels, is supported by a suitable truck K, the truck-wheels having flanges thereon and the rear driving-wheels being also provided with flanges, but the other drivers have no flanges. In a light engine the truck K may be dispensed with. Each of the driving-axes J' has a sprocket-wheel *j* fixed thereto, the sprocket-wheels being arranged in such a manner that they will not align, and each of the sprocket-wheels is connected by a chain L' with a sprocket-wheel L, which is fixed to the counter-shaft M, there being a sprocket-wheel on the counter-shaft for each chain. The counter-shaft M is mounted in suitable hangers M', which are supported in front of the driving-wheels and between the strip E and the braces F. The counter-shaft M aligns horizontally with the main driving-axes J', so as to get a straight pull thereon, and aligns vertically with the cylinders C. The shaft M is provided at equal distances from the center with gear-wheels *m*, and pivoted in the bed D above the shaft M and in vertical alignment therewith are the crank-shafts N, the cranks N' of the crank-shafts connecting with the cylinder-pistons by connecting-rods O in the usual manner. The crank-shafts N are each provided with a gear-wheel *n*, which meshes with a gear-wheel *m* on the shaft N, and it will be seen that the cranks N' may be placed at a desired angle to each other by means of the connecting gear-wheels *m* and *n*.

On each side of the engine are two equalizing-bars P, having vertical standards P', which work—i. e., slide—in cases or sockets Q, containing spiral springs Q', against which



the said standards act with a force corresponding to the load carried by the car. The ends of the equalizing-bars P are pivotally connected by means of the links *p* with the yokes R, which ride upon the axle-boxes II, said yokes having centrally thereon the depending projections *r*, which rest upon the axle-boxes, and the yokes R extend through the bifurcated jaws G, and are thereby prevented from moving laterally. The extreme front ends of the forward yokes R and the extreme rear ends of the rear yokes R are pivoted to the rods S, which extend downward through the braces F and are provided at their lower ends with suitable nuts, heavy rubber washers T being interposed between the nuts and the braces, so as to allow a limited vertical movement to the rods S; but it is obvious that instead of using the rubber washers spring-washers might be substituted with the same effect.

The engine operates as follows: When the pistons in the cylinders C are moved, the motion is transmitted to the crank-shafts N, and from them by means of the gear-wheels *m* and *n* to the counter-shaft M, from which the power is transmitted by the sprocket-wheel L to the driving-axles J', thus turning the axles and propelling the engine, and it will be observed that the equalizing-bars and the connecting-yokes support the weight of the main frame, and as said parts are pivotally connected together and have a yielding connection with the braces F, as shown, the weight of the main frame will be distributed throughout the various equalizing-bars and yokes. It will also be observed that as the counter-shaft M aligns with the driving-axles J' a direct pull is obtained, and the strain on the chains is not increased by the variation in position of the wheels.

I have shown the engine provided with six driving-wheels; but it is obvious that a greater or less number may be used by providing a greater number of driving-sprockets and equalizing-bars. It will be seen, also, that a great advantage is obtained by having two crank-shafts instead of one double-crank

shaft, as in the ordinary chain-driven engine, as the crank-shafts will be less likely to be cramped, and if one is disabled the engine may be propelled by means of the other.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A tram-engine having suitable driving wheels and axles, a counter-shaft horizontally aligning with the axles, a sprocket-wheel connection between the counter-shaft and the axles, two crank-shafts journaled above the counter-shaft and connected therewith by a gear mechanism, and a suitable engine for operating the crank-shafts, substantially as described.

2. The combination, with the frame, the pairs of vertical jaws G, and the journal-boxes movable vertically therein, of boxes Q between the pairs of jaws, vertically-sliding spring-seated standards P', working therein and having the equalizing-bars P on their lower ends, a yoke R, crossing each box and having a central bearing-point *r* thereon, links *p*, connecting the adjacent ends of the bars and yokes, and rods S, depending from the outer ends of the end yokes and having a yielding connection with a brace on the frame, substantially as set forth.

3. The combination, with the frame, the pairs of vertical jaws, each slotted longitudinally, and a box sliding between each pair of jaws, of a single yoke passing through and working in the slots of each pair of jaws above the boxes and having central bearings *r* on the boxes, the boxes Q, the spring-seated standards P', working therein, the equalizing-bars P, carried by the standards, links connecting the adjacent ends of the bars and yokes, and rods S, depending from the outer ends of the end yokes and yieldingly connected at their lower ends with a frame-brace, substantially as set forth.

WALTER DE SANNO.

Witnesses:

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S. B. DUNHAM.