F. S. W. NOWOTNY.

Locomotive Running-Gear.

No. 162,410. Patented April 20, 1875.

Fig. 1.

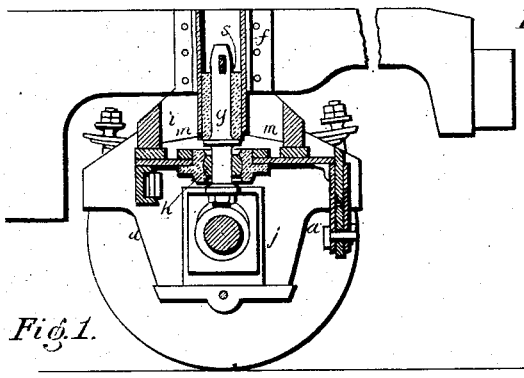


Fig. 2.

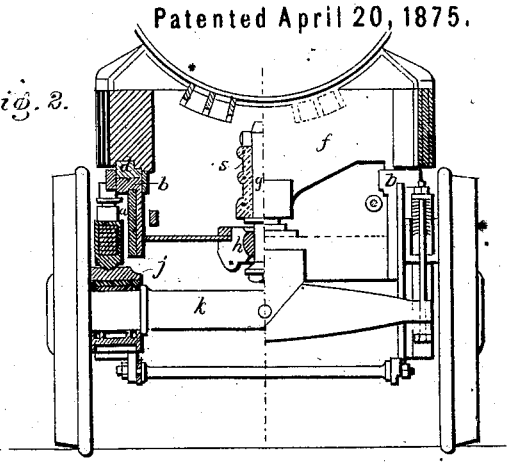


Fig. 3.

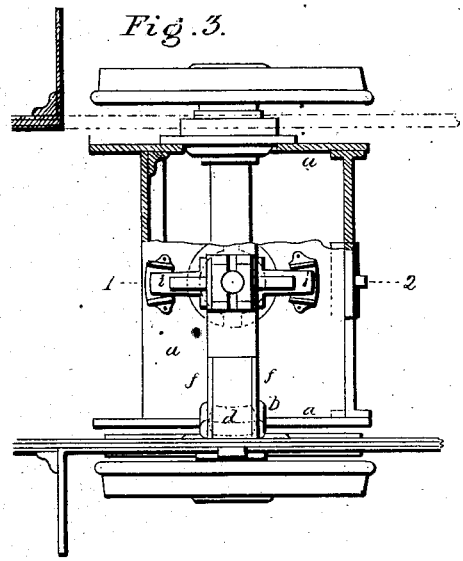


Fig. 7.

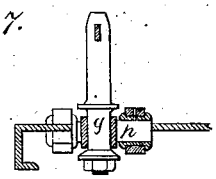


Fig. 8.

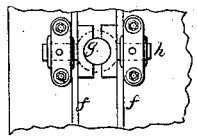


Fig. 5.

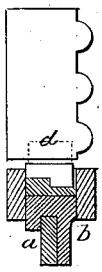


Fig. 4.

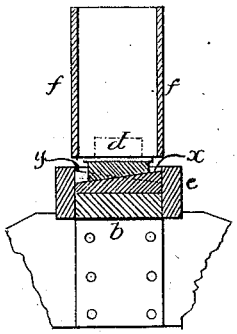
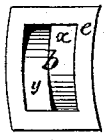


Fig. 6.



Witnesses:
J. R. Shidmore
Harry Paleman.

F. S. W. Nowotny
By his attys.
Howson & Son.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

FRANZ SERAPH WENZEL NOWOTNY, OF DRESDEN, SAXONY.

IMPROVEMENT IN LOCOMOTIVE RUNNING-GEARS.

Specification forming part of Letters Patent No. **162,410**, dated April 20, 1875; application filed February 13, 1875.

To all whom it may concern:

Be it known that I, FRANZ SERAPH WENZEL NOWOTNY, of the city of Dresden, in the Kingdom of Saxony, have invented certain new and useful Improvements in Locomôtives, of which the following is a specification:

My invention relates to the construction of a locomotive-engine for service on railroads with very sharp curves of a small radius, as well as with heavy grades; and my invention consists in constructing the fore truck of a locomotive-engine with two wheels only, the fore part of the locomotive being pivoted vertically, or nearly so, over the center of their axle, which latter has its boxes in a frame of peculiar construction, as will be hereinafter more fully described.

In the accompanying drawings, Figure 1 represents a sectional side elevation of a locomotive fore truck constructed according to my invention; Fig. 2, a front elevation of the same, partially in section; Fig. 3, a plan or top view, also partially in section; Figs. 4, 5, and 6, detached sectional views of a portion of the same; and Figs. 7 and 8, a modification, relating to the construction and arrangement of the pivot of the truck.

Like letters of reference indicate like parts in the several figures.

Many unsuccessful attempts have been made to construct a locomotive capable of passing through sharp curves and up heavy inclines with a satisfactory speed without unusual wear on the rails and on the wheels, and with perfect security against accidents. While laterally-sliding axles allow trains to pass sharp curves with security, the abrasion and wear of both wheels and rails are very considerable, and when applied to locomotives they cause, at higher degrees of speed, dangerous oscillations of the fore part of the engine, especially in locomotives with outside cylinders. Engines provided with a "bogie" frame, having four leading wheels and a swiveling fore truck, pass sharp curves well on a plain; but where heavy grades have to be passed, the dead weight of the four leading wheels and truck is a great inconvenience and disadvantage.

To overcome these difficulties and disadvantages, I construct my improved locomotive with only one swiveling fore axle, the fulcrum of which lies vertically over the center of the axle itself.

In the accompanying drawings, *a a* represent the fore truck of a locomotive-engine, in the boxes *j* of which the axle *k* revolves. At each side of this truck are bearing-pieces *b b*, on which rest blocks *d d*, attached to the frame of the engine. Each of the pieces *b b* and blocks *d d* has two bearing-surfaces, *x y*, inclined in opposite directions and at right angles to the line of the axle, as shown in Figs. 4, 5, and 6.

By this construction the tilting of the truck-frame *a a* forward or backward, in ascending grades, is prevented, while at the same time these bearing-surfaces permit the radial turning of the axle around its pivot in turning curves. In order to prevent the axle from radiating from its normal position farther than is necessary, in order to turn the shortest or sharpest possible curve, the bearing-pieces *b b* and the corresponding portions of the blocks *d d* are surrounded by a frame, *e*, slightly curved to conform to the radially-curved shape of the bearing-pieces, and extending above the latter. The blocks *d d* are held between two cross-pieces, *f f*, secured at their ends to the sides of the main frame, and between which is also held the bearing of the pivot or king-bolt *g* of the fore truck. These cross-pieces may also serve to support the front portion of the boiler. The bearing of the king-bolt *g* in the truck *a a* is constructed with a universal ball-joint, *h*, consisting of two semi-spheres, which allows the bolt a certain amount of vertical play, as well as permits the usual movements of the truck.

In Figs. 7 and 8, however, I have shown a modification, which, in certain cases, may be preferable. In this all the vertical play of the king-bolt *g*, in its bearing in the truck, is prevented by providing the bearing *h* with two trunnions, *h'*, at right angles to the axle, which oppose any tendency of the truck to tilt forward or backward, but permit either side to be elevated or depressed.

For increased safety, extra bearing-pieces *i i*, Fig. 1, may be fixed at right angles to the cross-pieces *f f*, and provided at their lower ends with inclined surfaces *m*, similar to those of the bearing-pieces *b b*, only smaller in proportion to the decreased distance from the ful-

crum; but these pieces *i i* form no essential part of my invention, and may be employed or not, as may be deemed best.

It will be readily understood from the foregoing description that the fore truck of a locomotive constructed according to my invention will not only, with perfect safety, turn the sharpest curves, but will also be very considerably lighter than the usual four-wheeled truck, thereby considerably lessening the dead weight in ascending heavy grades, while at the same time the weight of the engine, while ascending, is thrown principally on the driving-wheels, thereby insuring their frictional hold on the rails.

I am aware that a fore truck having but one axle, and connected to and partly supported by a rear truck, has been heretofore used, and do not claim, broadly, the combination, with a locomotive, of a truck having a single axle; but

I claim—

1. A locomotive provided with a fore truck having a single axle, *k*, turning upon a king-bolt, *g*, which is the sole means of connecting the truck to the frame of the engine, all as set forth.

2. The combination of the fore truck, having a single axle, and turning on a central king-bolt, *g*, which is the sole means of connecting the truck and frame, and bearings arranged at opposite sides of the bolt, retaining the truck in its vertical position without interfering with its limited movement upon the bolt, as set forth.

3. The bearings *b*, consisting of curved and inclined faces *x y*, adapted to corresponding faces of bearing-blocks *d* upon the frame of the engine, as set forth.

4. The combination of the truck, the king-bolt *g*, and a bearing, *h*, confined to the truck, capable of an oscillating movement in one or more directions, and recessed to receive the king-bolt, substantially as set forth.

FRANZ SERAPH WENZEL NOWOTNY.

Witnesses:

LORENZ BRENTANO,

BRUNO SCHERR.