(No Model.)

H. F. SHAW.

LOCOMOTIVE.

No. 306,966. Patented Oct. 21, 1884.

Fig. 1.

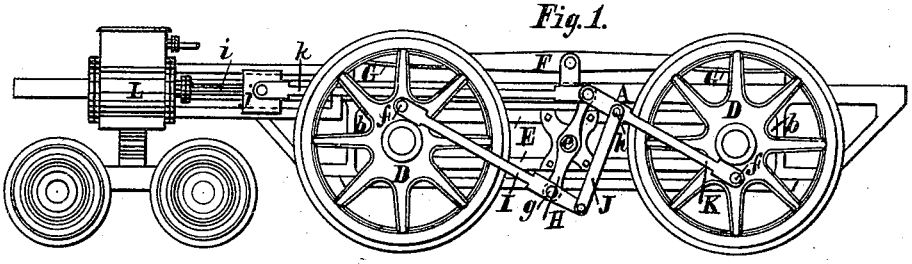


Fig. 2.

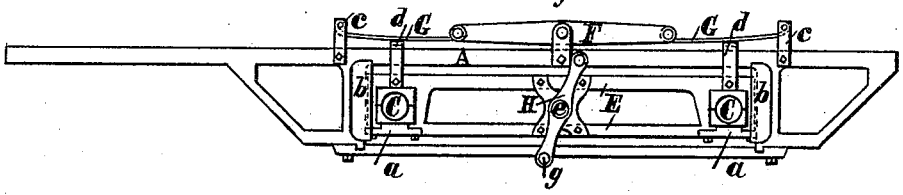


Fig. 3.

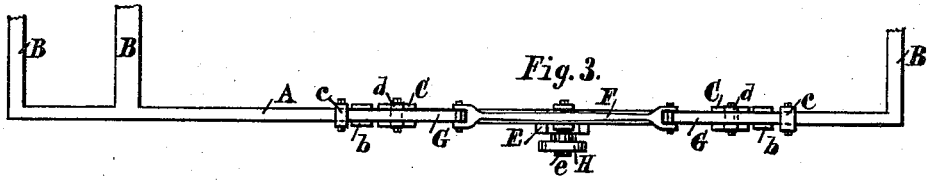
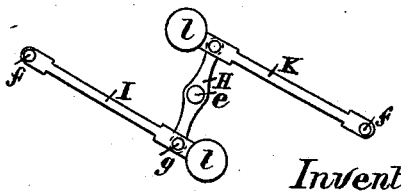


Fig. 4.



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LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 306,966, dated October 21, 1884.

Application filed February 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. SHAW, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Locomotive-Engines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to locomotive-engines, and is intended as an improvement on the locomotive-engine invented by me for which Letters Patent No. 267,726, dated November 21, 1882, were granted, to which reference may be had.

The first part of my invention consists in means for maintaining the centers of the two driving-wheels and the center of the pivot of the oscillating bar on each side of the locomotive in one and the same straight line, while providing for the unequal vertical movements of the driving-wheels caused by the unevenness of the railway.

The second part of my invention consists in means for balancing the rods connecting the oscillating bar with the driving-wheels, and hence for making each of said wheels perfectly balanced.

In the drawings, Figure 1 is a side view of so much of a locomotive-engine embodying my invention as is sufficient for illustration of the same; Fig. 2 is a side view of some of the parts of Fig. 1, the wheels, cylinder, and some of the connections being removed. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 illustrates a modification to be referred to.

The side rail, A, and cross-rails B are such as are suitable for other parts of the engine and for the adaptation of my improvement, as herein set forth. The boxes C C on each side of the engine for the axles of the driving-wheels D D are fixed in a frame, E, provision being made, as by means of a removable piece, *a*, for inserting and adjusting each box. The frame E may move vertically with reference to the rail A, and hence, with reference to the body of the engine, either in such a manner as to carry both boxes up or down equally, or one more than the other, being guided by suitable guides *b*, fixed to the rail A. The body of the engine being supported by the two rails—one, A, on each side—each of said rails is supported by a frame, E, by means of a yoke, F, and springs G. Each of these springs is connected at one end to one end of the yoke, and at the other end to the rail A, as by means of a projection, *c*, and bears on a frame, E, as by means of a projection, *d*, fixed to said frame. In other words, the yoke and springs are similar to those now in use and for similar purposes, but with my arrangement are to be connected with the frame E bearing the two boxes, instead of being connected with two boxes not fixedly connected with each other.

To the frame E is pivoted, at *e*, the oscillating bar H, at each end of which is pivoted a connecting-rod. Each of these connecting-rods is pivoted at the outer end on a crank-pin, *f*, of a driving-wheel. One, I, of these rods is extended beyond the place *g* of pivoting to the oscillating bar, and has pivoted thereto one end of a link, J. The other end of this link is pivoted to the other connecting-rod, K, on the same side of the oscillating bar, as at *h*.

One or two steam-cylinders, one above the other, may be employed on each side of the engine. One only, L, is here shown, the piston-rod *i* being fastened at its outer end to a sliding block, *j*. A connecting-rod, *k*, is pivoted at one end to the block *j* and at the other end to the oscillating bar H. Thus motion is given to the oscillating bar, and by means of the same and the connecting-rods I and K, the driving-wheels are revolved. The two boxes C C on each side of the engine being fixed in a frame, E, which has pivoted thereto the oscillating bar, and which can have the vertical movements specified with reference to the supporting-rail A, the driving-wheels may conform to the unevenness of the railway, while the centers of the two wheels and of the pivot of the oscillating bar are maintained practically in one and the same straight line. The connecting-rods I and K are thus kept in proper relation to the wheels for equal and regular action on the crank-pins. The connecting-rods I and K being tied together by means of the link J, the weight of one is balanced by that of the other, so that their weight is taken off the driving-wheels, and hence

these wheels may be perfectly balanced. These connecting-rods I and K may be balanced and their weight taken off the driving-wheels by extending each rod beyond the place of pivoting the same to the oscillating bar H and making such extensions, as *l l*, of suitable weight, as illustrated in Fig. 4.

I claim as my invention—

1. In combination with two driving-wheels on one side of an engine, a pivoted bar, H, and two connecting-rods, I and K, balanced as specified, and pivoted to said bar and on the crank-pins, substantially as and for the purpose set forth.

2. The combination of two driving-wheels, oscillating bar H, connecting-rods I and K, and link J, substantially as and for the purpose set forth.

3. In a locomotive-engine, and in combination with guides fixed to the main frame-work, two frames, E, one on each side of the engine, each connecting fixedly with reference to each other two boxes for the axles of the driving-wheels, each frame being independent of the other—that is, not rigidly connected thereto—whereby each may have vertical movements independent of those of the other, substantially as and for the purpose set forth.

4. The combination of the vertically-moving frame E, rail A, oscillating bar H, connecting-rods I and K, wheels D D, and axles and boxes therefor, substantially as specified.

5. In a locomotive-engine, the combination of an oscillating bar, two connecting-rods pivoted to said bar and on the crank-pins on the driving-wheels, as specified, and means, substantially as the frame E, for maintaining the center of the pivot of said bar in line with the centers of the boxes for the axles of said wheels, said boxes being free to move vertically with reference to and independently of the main frame-work of the engine, substantially as set forth.

HENRY F. SHAW.

Witnesses:
WILLIAM H. SOLOMON,
EDW. DUMMER.