

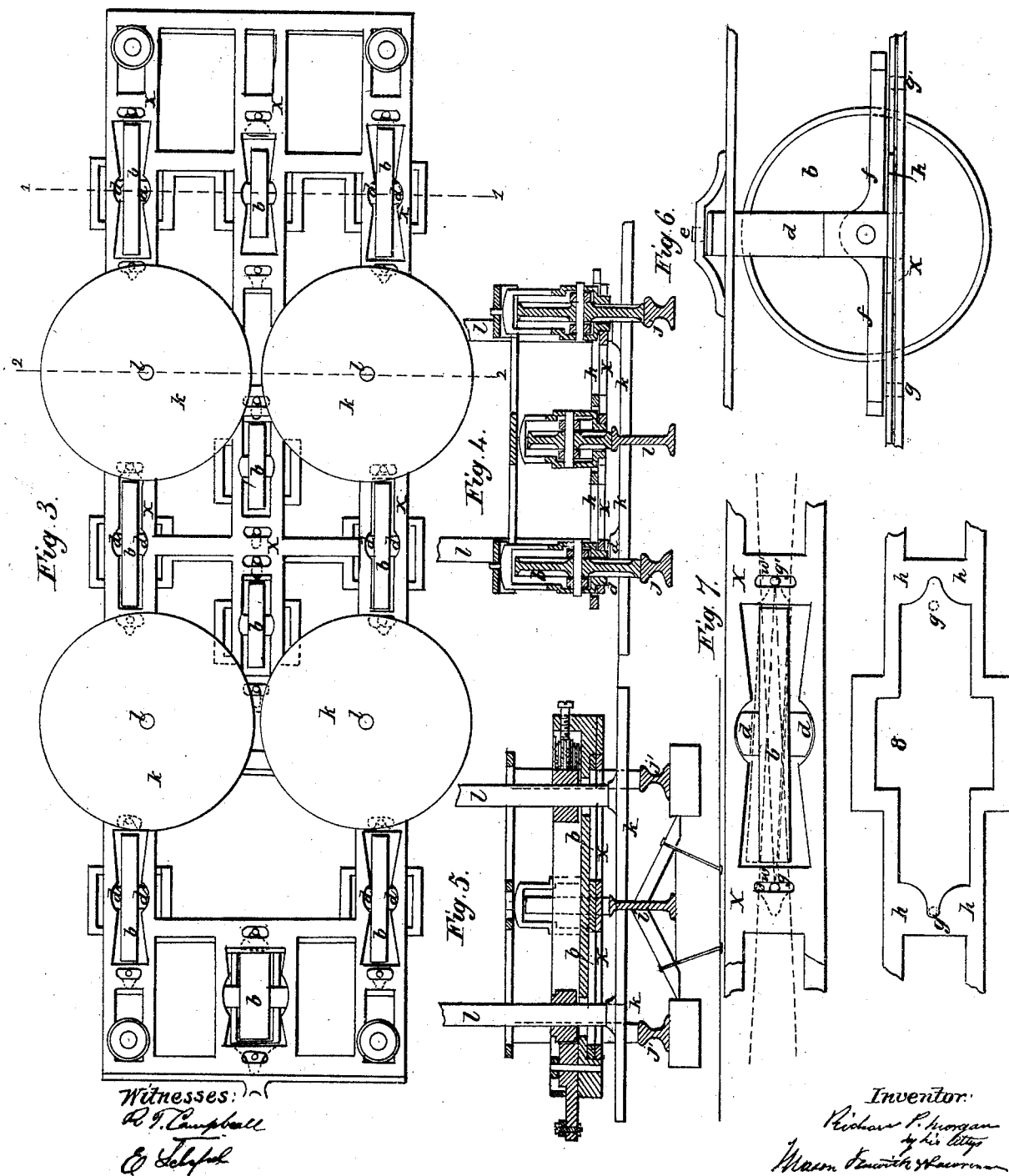


R. P. MORGAN.

**Locomotive.**

No. 44,997.

Patented Nov. 8, 1864.



# UNITED STATES PATENT OFFICE.

RICHARD P. MORGAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND  
RICHARD P. MORGAN, JR.

## IMPROVEMENT IN CONSTRUCTING AND OPERATING LOCOMOTIVES FOR RAILROADS.

Specification forming part of Letters Patent No. 44,997, dated November 8, 1864.

*To all whom it may concern:*

Be it remembered that I, RICHARD P. MORGAN, of Chicago, in the State of Illinois, have invented a new and useful Improvement in the Mode of Constructing and Operating Railroads; and I do hereby declare that the following is a clear and exact description of my said invention, which will be better understood by reference to the accompanying drawings, in which—

Figure 1 is an elevation showing the construction of the locomotive-engine and the mode of placing the rails and operating the machinery. Fig. 2 is a plan of the locomotive. Fig. 3 represents the locomotive as seen from below, or inverted. Figs. 4 and 5 are cross-sections of the lower portions of the locomotive, through the lines 1 1 and 2 2 of Fig. 3. Fig. 6 is a side elevation of one of the bearing-wheels with its immediate fixtures. Fig. 7 is an inverted plan of such wheel and fixtures. Fig. 8 is a portion of the "slide-frame," which will be more fully described hereinafter.

In the construction of my improved railroad I use three bearing-rails, arranged as shown in Figs. 4 and 5. The two side rails, *j j*, are made and placed like the rails of an ordinary railroad, except that, as they are not subjected to the same side-thrusts, they will not be required to be as firmly fastened to the cross-ties.

The center rail, *i*, is elevated above the side rails sufficiently to permit the driving-wheels *k k* to pass clear of the side rails and engage in a proper manner with these center rails. These driving-wheels are placed nearly horizontal, though they may be considerably inclined without greatly affecting the result. As the center rail is subjected to much side pressure it must be firmly fixed and well supported.

Instead of using the same wheels for guiding, sustaining, and propelling the locomotive, I make use of two distinct sets of wheels—one to be used as bearing-wheels alone, and the others as driving and guide wheels. The bearing-wheels I construct with a cylindrical tread and without flanges. In other respects they are constructed and operate like ordinary truck-wheels. The other set of wheels is used both for driving and guiding the loco-

motive. They are placed with their axles vertical, or nearly so, as shown in Fig. 1, with the proper pitmen, cranks, and connecting-rods, arranged as there shown or in other suitable way. By means of the cams *s s* pressing against the boxes *r r*, and the reaction thereof against the springs *t t*, which press against the corresponding boxes on the opposite wheels, these driving-wheels may be made to press against the center rail with any degree of force that may be required, and thus create the requisite amount of frictional adhesion.

I have represented these driving-wheels as pressing against the neck or thinner portion of the section of the rail. This is the position I prefer to give them, though it is evident that they may be made to press against the head or tread of the rail, in which case they might each be constructed with a central groove or double flange, which would effectually prevent them from slipping from the head of the rail. These center rails may be made symmetrical or with a tread of the same shape upon their upper and lower edges, so that when one tread becomes worn the lower edge may be turned upward and thus be renewed with very little cost or trouble. The cams *s s* are worked by a rod, *u*, having a screw, *v*, which may be operated by a crank or otherwise so as to force the rod *u* in either direction, by which the pressure upon the driving-wheels may be increased or diminished at pleasure. Each of the bearing-wheels is supplied with a guide-frame, *f f*, which is attached to the supporting-frame *d* by means of the axle *c* of the bearing-wheel *b*. This axle is made some fifteen inches in length and extends through the supporting-frame *d*, but no farther. It is made fast in the supporting-frame and does not turn with the wheel. Between the guide-frame and the supporting-frame a sufficient play is left for a purpose which will be mentioned presently, but none between the wheel and the guide-frame, except that which is necessary to enable the wheel to revolve freely around its axis; but the wheel and the guide-frame can slide backward and forward on the axle as far as will be necessary for the purpose hereinafter mentioned.

The drawings, Fig. 7, shows the manner in

which a portion of the permanent frame  $x x$  is constructed. It is represented in an inverted position, so that the sliding frame  $h h$  appears underneath it. Two slots,  $w w'$ , are made on opposite sides of the wheel  $b$ , in which slots the pins  $g g'$ , which are firmly fixed in the guide-frames  $f f$ , are intended to work. When the locomotive is to move to the right, the sliding frame,  $x x$  is made to slide backward or to the left, as is represented in Fig. 7. This sliding frame, being constructed as is shown in Fig. 8, confines the pin  $g'$  at the central point of the slot. At the same time the pin  $g$  at the other side of the wheel is released, so that the wheel may have sufficient play to enable it to follow the tractive force exerted through the central pin in front without any binding or constraint. If the locomotive is to move to the left or backward, this sliding frame  $x x$  is made to slide in the opposite direction, by which means the pin  $g$ , which is now in front of the wheel, is fixed in the central point of the slot and the opposite pin is released from its confinement, so that the wheel and its guiding-frame may freely obey the tractive force by which it is now moved, the said wheel and guiding-frame sliding on its axis  $c$  and the supporting-frame  $d$  working around its swivel-pin  $e$ , and in the arcs of the circle constructed in the permanent frame  $x x$ , as shown in Fig. 7. The sliding frame  $h h$  is so constructed that all parts move equally and at the same time in order that all the wheels  $b b$  may be in a condition to move either backward or forward at the same moment, being severally drawn from a point in front for the time being at the same instant.

I have represented my locomotive with ten bearing-wheels, but this number has nothing to do with the principle of the invention. It is not even necessary that there should be any bearing-wheels at all on the central rail, though I prefer the use of such central wheels, because in this way not only is there less weight upon each wheel, but the pressure upon the central rail tends to steady it and keep it in position.

I propose to make the permanent frame as nearly inflexible as practicable. As the wheels are each provided with its springs, the inequalities in the surface of the rails will not prevent any of these wheels from bearing upon the rail, though the pressure will be greater

upon the more elevated portions than upon those which are more depressed. This will have a constant tendency to preserve the rails in their proper level and keep up the uniform difference of elevation between the side and the center rails.

The cars to be used with my locomotive may be the same as those in common use and without any bearing-wheels on the center rail, or they may have central wheels with grooved surfaces or a double flange, or, finally, the wheels may be made without flanges at all, the cars being held in their proper position upon the rails by guide-wheels, standing in a position similar to the driving-wheels above described, except that they should not press upon the center rail. As they are not used for driving-wheels they should have short axles without cranks.

I do not intend to limit myself to the particular instrumentalities above shown for carrying my invention into practical use, but merely set them forth as one means of carrying into effect the principle of that invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. So constructing a locomotive with reference to a railroad constructed as herein described, that none of the supporting-wheels need be used as driving-wheels, substantially as above shown.

2. The guide-frames  $f f$ , with their pins  $g g'$ , in combination with the sliding frames  $h h$  and slots  $w w'$ , by means of which the bearing-wheels  $b b$  may always be drawn from a point in advance thereof, whether the locomotive be moving backward or forward.

3. The cams  $s s$ , the springs  $t t$ , the rod  $u$ , and the screw  $v$ , for the purpose of producing the requisite pressure of the driving-wheels upon the central rail, substantially in the manner and for the purpose described.

4. The use of independent bearing-wheels with short axles, in combination with horizontal guide-wheels and a central rail, constructed and arranged as above described.

RICHD. P. MORGAN.

Witnesses:

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E. SCHAFER.