T. S. MINNISS.

Traction Wheel.

No. 107,702. Patented Sept. 27, 1870.

Fig. 1.

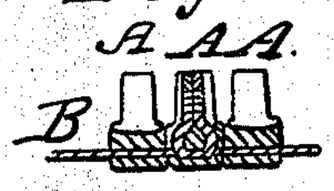



Fig. 2

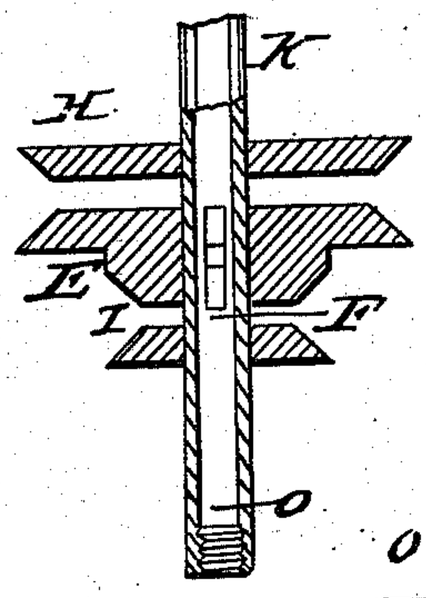



Fig. 3

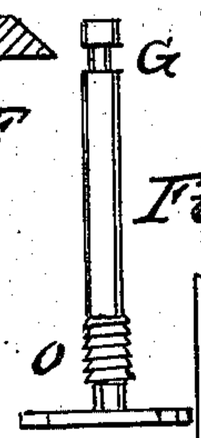



Fig. 4

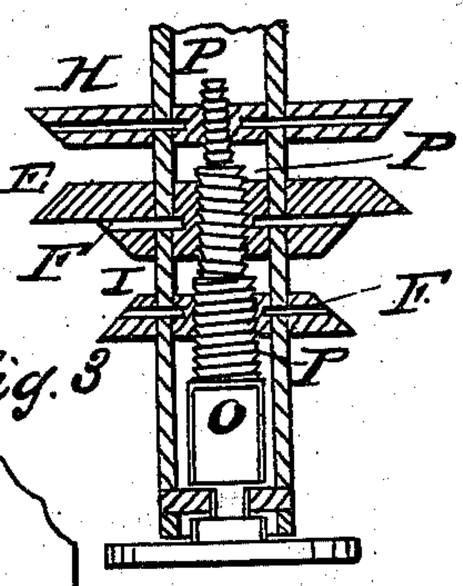



Fig. 5

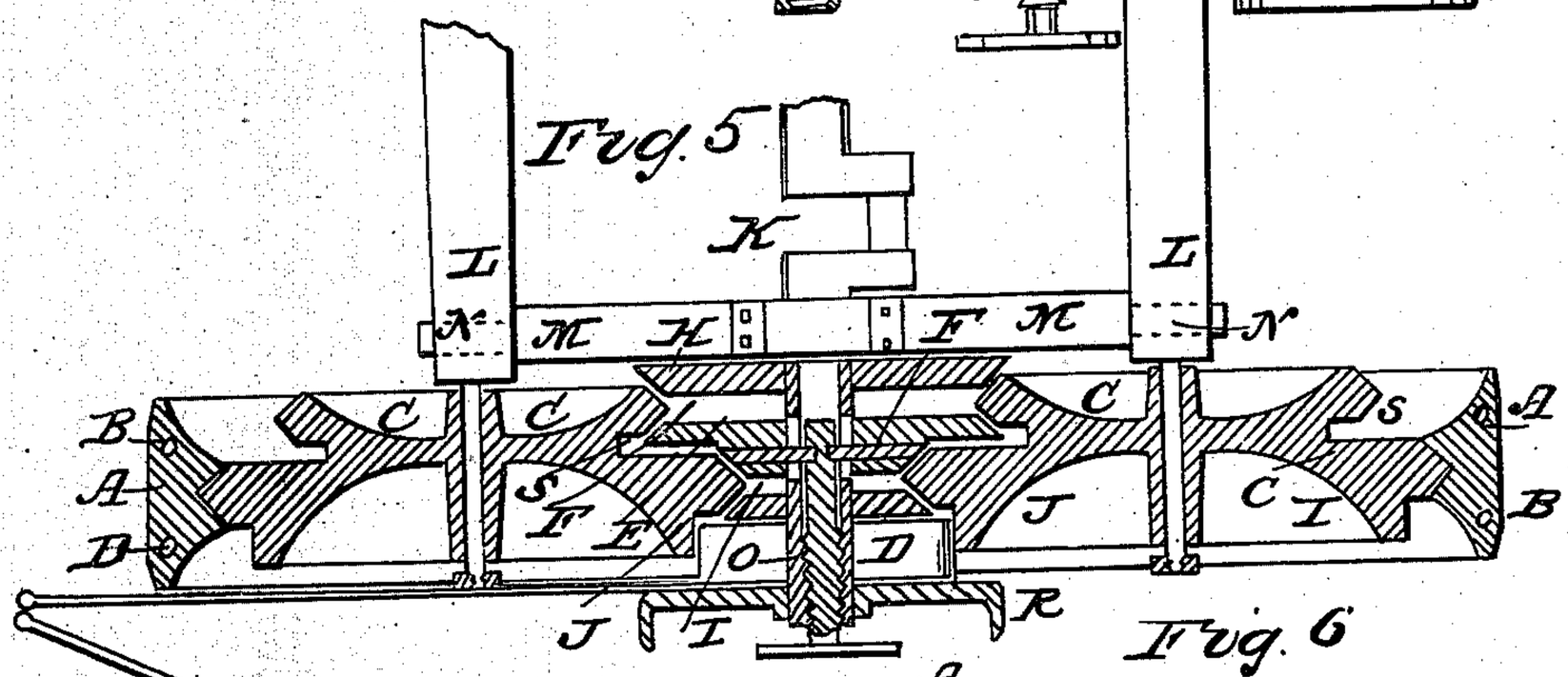
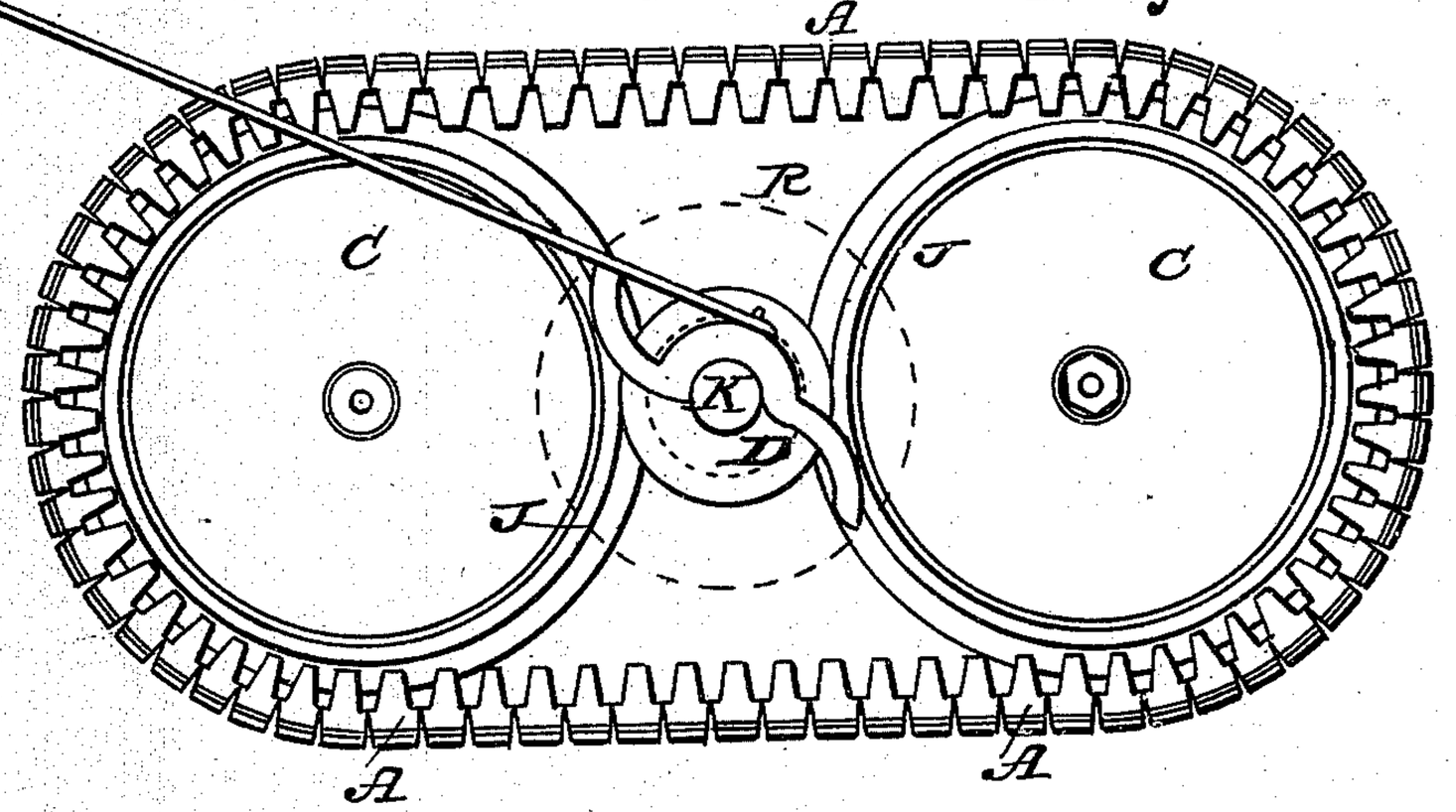



Fig. 6




Witnesses

B. G. Davis

D. P. Compton

Inventor

Thomas S. Minniss

# United States Patent Office.

THOMAS S. MINNISS, OF MEADVILLE, PENNSYLVANIA.

Letters Patent No. 107,702, dated September 27, 1870; antedated September 17, 1870.

## IMPROVEMENT IN FRICTION-LOCOMOTIVES.

The Schedule referred to in these Letters Patent and making part of the same.

I, THOMAS S. MINNISS, of Meadville, in the county of Crawford and State of Pennsylvania, have invented a Friction-Locomotive for traveling on the ground, plowing, towing boats, &c. A caveat, embodying some features of the same, was filed sometime in the summer of 1868.

My invention consists in making a locomotive with two or more driving-wheels on each side, with double beveled rims, having V-faced pulleys fitted between them on the engine or propelling-shaft, which must be on a line with, and central to the axles. By having two or more rims on each driving-wheel, of different diameters, and corresponding pulleys to fit them on the shaft, different speeds can be given with the same motion of the engine, as the pulleys are all split in two at the middle of each V, and are made to open and close, and thus relieve or grasp any of the rims desired.

Around and over the wheels, on each side, I stretch a strong belt made with thin blocks of wood or iron strung on wire cords or their equivalents, on the edge of the blocks. I cut a V across their middle, so that, when in line, they form a track fitting the beveled rims of the driving-wheels, and thus make, when tightly stretched, a broad upbearing surface on the ground.

The machine is guided by the action of a brake on each side, that presses equally against the rims of both driving-wheels, and not only checks them, but forces them away from the friction surface of the central driving V-pulley, while the other side, being in gear, will gain just according to the check that is given by the brake, which is relaxed the instant the desired direction is attained.

The adjustable friction-pulleys on the propelling-shaft have a fourfold action and value in the combination; first, as a clutch, available at any point; second, changing the speed gear; third, tightening the belts, so as to make just the required friction for propulsion, and yet not increase the friction on axles or shaft an iota; and fourth, making a stiff upbearing track of the belt, as will more fully appear in the following specification.

Figure 1 is a section of the belt, showing how the two ends of the wire cord are united.

Figure 2 is a horizontal transverse view of one end of the engine-shaft, with its adjustable Vs.

Figure 3 is the stem and screw belonging to fig. 2.

Figure 4 is another plan of figs. 2 and 3.

Figure 5 is a horizontal transverse section of one entire side of a machine, embodying my invention.

Figure 6 is a side elevation of fig. 5.

The same letters refer to like parts in all the figures.

A A A are blocks, with holes near each end, through which the wire cord B B passes, and, when united, as seen at fig. 1, an endless belt is formed. The thinner the blocks the more flexible the belt, and the less motion of each block on its fellows as it curves from a straight line back and forth. The point of contact at the sides of the blocks must be slightly rounded, and should extend the whole length of the block, so as to leave no open crack across the belt for dirt to work through.

For a ten-horse-power engine I would make the wheels C C about four feet diameter, and the belt A B about fifteen inches wide, (the length of each block.) When the the belt is made of wood the blocks should be about one inch thick, and two inches deep, from the bottom of the V to the ground; but, when of iron, the blocks need not be solid, but will be made thin, and ribbed, to give the required strength. Each block turns up about one inch at both ends, with a slant about three inches long, so that, in turning, the belt will not dig into the ground.

The two ends of the wire cord are made to pass each other in one block, and, when the whole is strung tight, the ends are bent upward, and tightly wrapped with wire. Where rims of different diameters are made on C C, their beveled surfaces must be made with sufficient space between, (see *s s*, fig. 5,) so that E can have freedom of movement on the shaft K.

The half Vs or bevel-edged rings H and I, are keyed to the shaft K, so as to allow the corresponding rims of the wheels C C to play between them, and not touch; but the central bevel-edged ring E moves on a pin, F, through a slot in the shaft K, and reaches far enough to catch into the recess G, (see fig. 3,) which works in the hollow end of the shaft with a screw, O, (see fig. 5.) Where the half Vs, H and I, are fixed to the shaft, it is necessary that the wheels C C should have a slight freedom of movement on their axles L L, (see fig. 5,) so that they can adjust themselves to the shifting centers of the driving Vs, when drawn up tight; but, if H, E, and I are made to work on pins F F F, which reach through the pulleys and the slots, and into the nuts P P P, which are moved inside the hollow shaft by right and left-handed screws on the same stem, (see fig. 4,) then the wheels C C need no play, as the two parts H and E mutually approach each other, while E and I retreat from each other, and *vice versa*.

It is intended that, when the axles L L just press the shoulders of the beam M, and E is just half way between H and I, the engine will play without moving the wheels; but turn the screw O, and draw E and I toward each other, the driving-wheels on each side are grasped by their beveled rims, and wedged apart till the required tension of belt is attained, to make the necessary friction to move the machine.

When greater speed is required with the same motion of the engine, just reverse the screw, and force E and H toward each other, and the end is attained.

All the pressure being from the center outward, the propelling power is just doubled, and, as the belt-tightener, *i. e.*, the screw O, revolves with the shaft, all friction is avoided, except for propulsion, by the tension of the belts.

The brake D is made to fit over the outer end of the engine-shaft, on each side, with a cam-shaped head touching the rim J on each wheel, and, when pressed with the long handle, the wheels C C are forced apart, the rim J, on one side, being a fulcrum, from which to force the other, and if the wheels are pressed back but the hundredth part of an inch, they are relieved from their driving-pulley, and, at the same time, checked by the action of the brake.

When it is desired to turn the moving locomotive to the right, the right-hand brake is applied, and, if severe enough to make a full stop, the other side will perform a circuit round it till the brake is relaxed, and and thus a guide-wheel is dispensed with.

The axles L L are kept on a line with the shaft K by the beam M, but they are free to move back and forth on the tenons N N.

By the use of the foregoing described combination, the machine need not be made rigid, but can twist and adapt itself to the surface like a common wagon, the only effect being to stiffen the belt.

The platform to hold the boiler and engines can be suspended below the axles, or the axles can be bent down under the platform, with springs at each corner, to give freedom for the running-gear to twist.

There is a driving-pulley, R, on the crank-shaft, for use when the engine is required for stationary work.

The width of the machine should be about equal to its length; the wider it is the more readily it turns. If it is desired to have smaller wheels, and yet more length of belt on the ground, any number of wheels may be added to a side by interposing a V-pulley between each two, on a line with their axles; but none of the friction-pulleys need to be adjustable but those on the propelling-shaft, and the added wheels will not require the brake-rims J, nor the additional beveled rims for varying the speed; and, if the engine-shaft is placed above the propelling-shaft, and geared thereto, wheels may be used as small as twelve inches in diameter for any length of belt, but not where the engine and propelling-shaft are one and the same, as then the crank would come too near the ground; and, in this case, I would make the middle wheels slightly larger in diameter, and yet, by keeping all their axles on a line, the heaviest pressure would be at the middle, acting as a pivot on which the ends would swing more freely.

As the engines which drive the locomotive must have a reverse motion, I will tighten and relax the belts by starting the shaft, and holding the screw O either by a long-handled wrench, or by a friction grasp on the stem, which will slip when screwed tight enough.

I claim as my invention—

1. The entire combination of shaft, adjustable pulleys, wheels, belts, and brakes, making a locomotive, which is propelled, turned, directed, checked, and lightly upborne, without the use of a guide-wheel, substantially as described.

2. The belt, with its V-shaped track, constructed in the manner and for the purpose hereinbefore set forth.

3. The wheels C C, with rims of various diameters, constructed as and for the purpose set forth.

4. The combination of the hollow shaft K, adjustable Vs, H, E, and I, pins F F F, nuts P P P, and screw O, substantially as and for the purpose set forth.

5. The cam-headed lever-brake D, constructed and operated substantially as and for the purpose set forth.

6. The combination of the shaft K, beam M, and axles L L, substantially as and for the purpose set forth.

THOS. S. MINNISS.

Witnesses:
B. G. DAVID,
D. P. COMPTON.