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G. T. SNYDER.
Road-Engine.

No. 197,423. Patented Nov. 20, 1877.

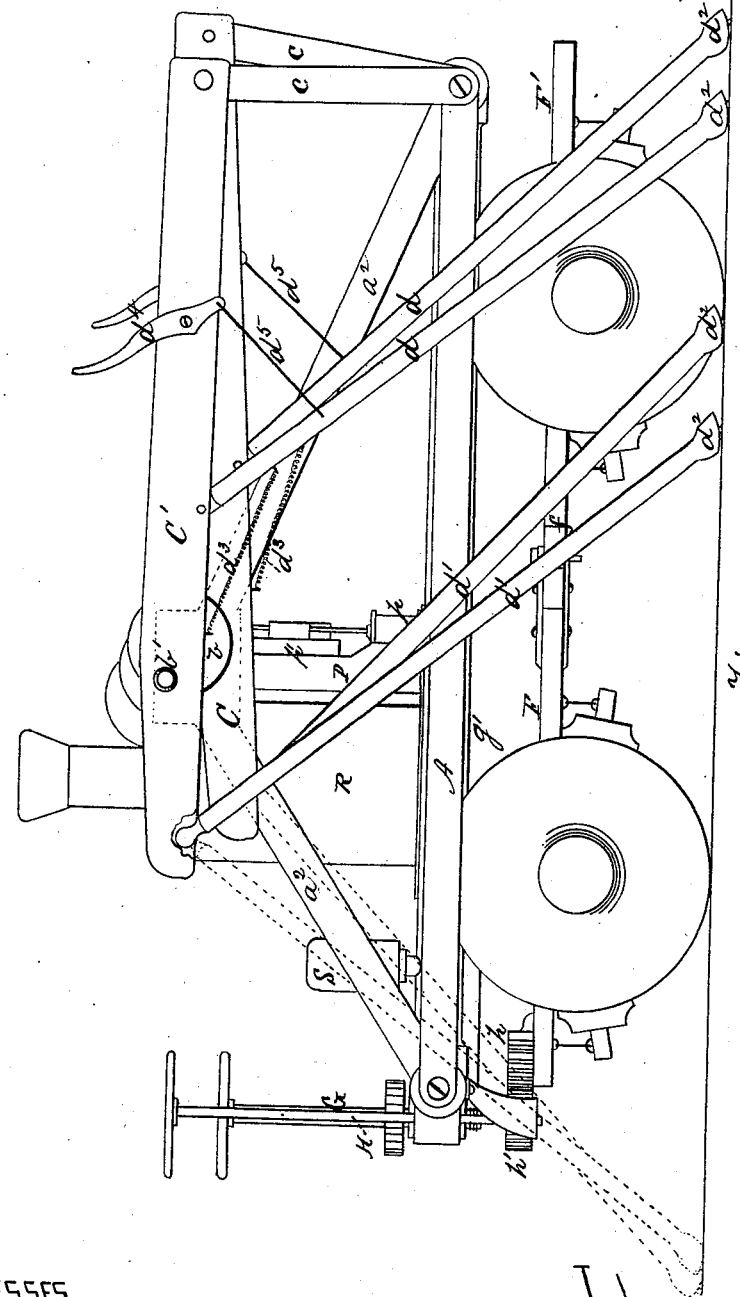

Fig 1.

Witnesses

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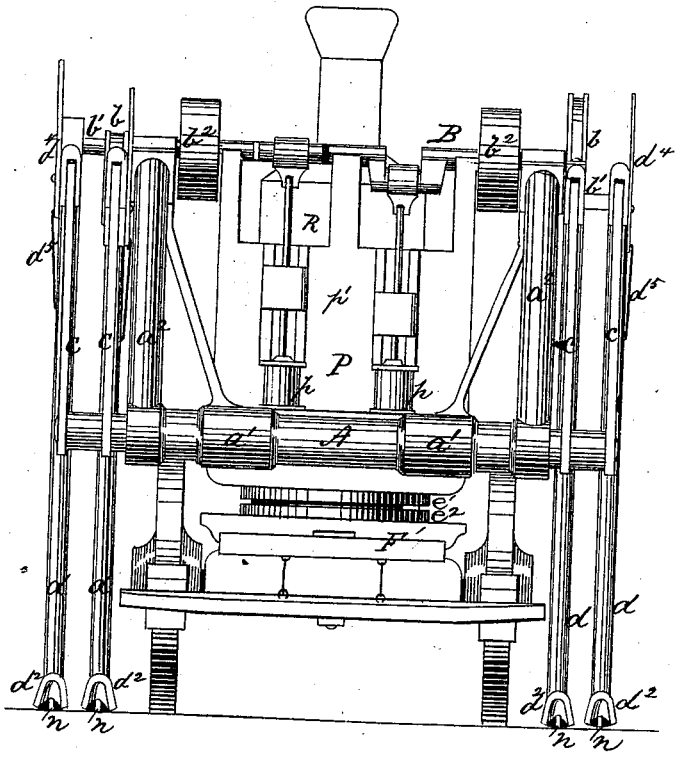

Fig. 2.

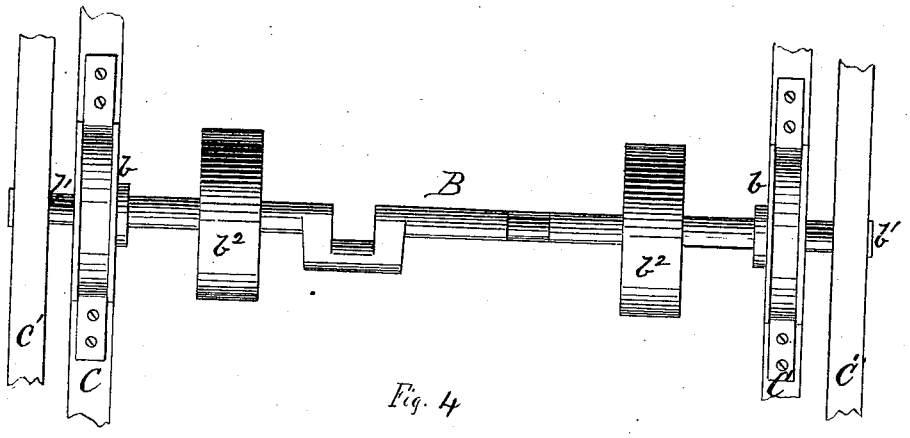

Fig. 4.

WITNESSES

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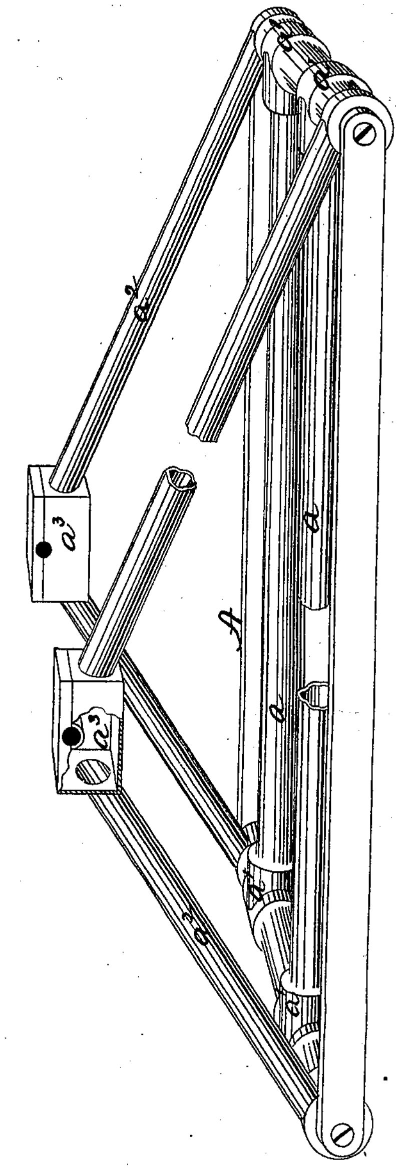

Fig. 3

Witnesses

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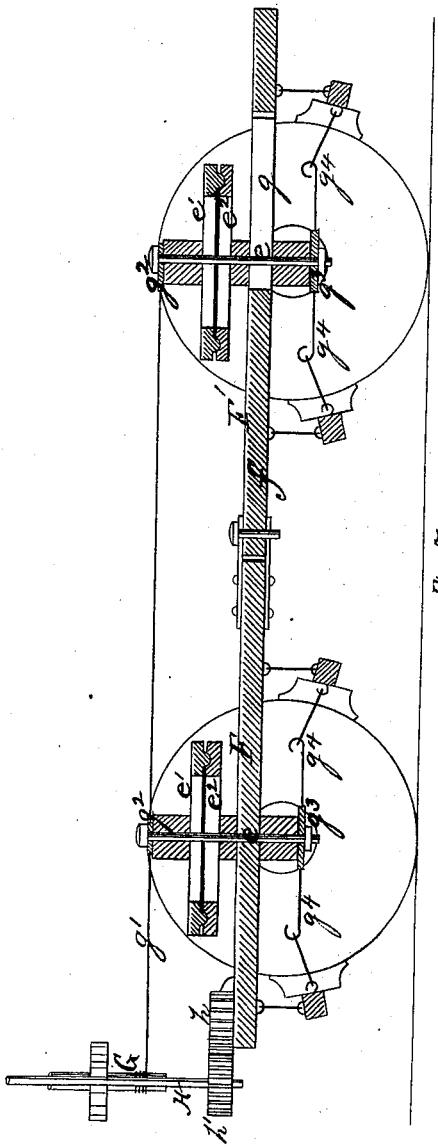

Fig. 5.

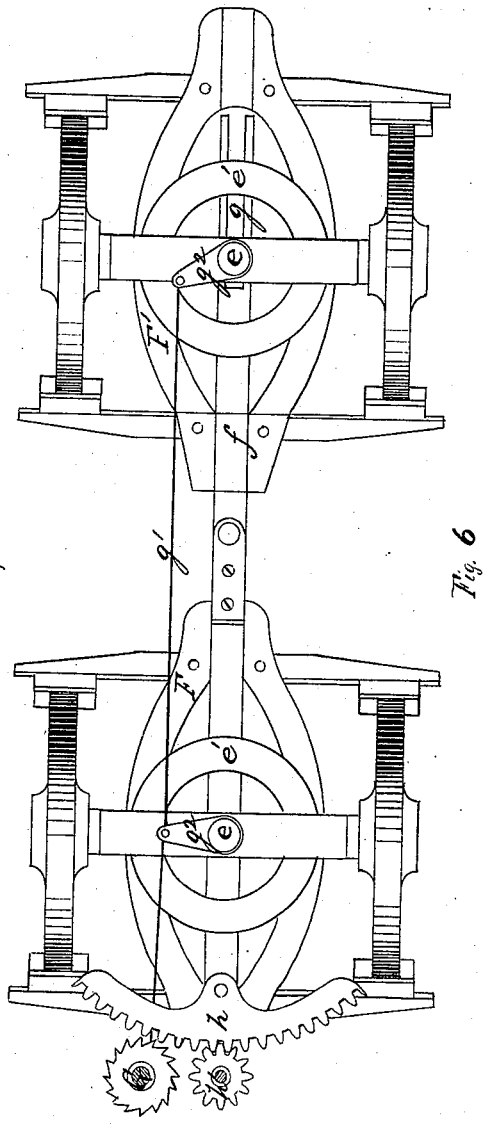

Fig. 6.

Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE T. SNYDER, OF NATRONA, PENNSYLVANIA.

IMPROVEMENT IN ROAD-ENGINES.

Specification forming part of Letters Patent No. **197,423**, dated November 20, 1877; application filed September 20, 1877.

To all whom it may concern:

Be it known that I, GEORGE T. SNYDER, of Natrona, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Road-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a side elevation of a motor embodying my invention. Fig. 2 is a rear elevation. Fig. 3 is a detached view of the frame or bed, partly in section. Fig. 4 is a detached view of the crank-shaft and portions of the horizontal drawing-bars. Fig. 5 is a longitudinal vertical section of the bed or frame and running-gear; and Fig. 6, a plan view of the running-gear and steering mechanism.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of road-engines, adapted for use upon ordinary roads, for plowing and for like purposes, and which can with slight changes, or rather adjustment of the gearing, be employed as a fixed motor, when so desired.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawing, A indicates a frame for supporting the operative parts. This frame is constructed of tubing a, connected by T joints a^1 to form a bed, from which rise the side rails a^2, likewise formed of tubing, connected by hollow cast bearing-blocks a^3, in which is journaled the driving-shaft.

B is the driving-shaft, arranged transversely of the machine, and journaled on the bearing-blocks a^3 of the side rails. The shaft B is a crank-shaft, furnished at each end with a cam, b, for actuating one horizontal driving-bar, and a crank, b^1, for actuating the other driving-bar of that side, and provided with pulleys b^2 for imparting power to other machinery at such times as the machine is employed as a fixed engine.

C C′ are horizontal driving-bars, of which two on each side are generally employed, said bars being pivoted at one end to the frame A by links or arms c, and connected at the other end to the crank-shaft B (the bars C) by cam-yokes, which inclose cams b, and (the bars C′) directly to the crank b^1, by which means the bars are reciprocated horizontally and also vertically at their forward ends, thus imparting to the legs or pushers a walking motion. Secured to the horizontal driving-bars C C′ are a series of legs, which, for the sake of lightness and strength, I construct hollow, (usually of wrought-iron tubing,) and which terminate in an expanded foot or hoop, d^2, preferably notched, as shown at n, to admit air, and facilitate the lifting of the foot in traversing muddy roads. For hard roads, a spike or like device may be inserted in the foot. Instead of the spikes, shoes may be used, or they may be used together. The shoes, if used, should be provided with toe-calks similar to a horseshoe.

The majority of the legs or pushers d d are provided with ordinary hinge-connections, are held in contact with the ground by traction-springs d^3, connected at one end to the leg, and at the other to the horizontal driving-bar, (C or C′,) and are raised and lowered at will by levers d^4 and links d^5, the levers being provided with means for securing them when it is desirable to lock up the legs d. In order to back the vehicle, several of the legs or pushers, usually the forward ones, marked d^1, are provided with universal-joint connections to the driving-bars C C′, so that they can be turned and caused to act in reverse direction.

F F′ indicate the trucks upon which the frame A is mounted. In order to insure the tracking the hind wheels in turning the vehicle and at the same time to avoid any interference between the legs or pushers and wheels, the trucks F F′ are pivoted to the frame or bed on the center-line by king-bolts e, or in other suitable manner, and are connected to each other by a jointed perch or pole, f, slotted as at g, or otherwise adapted to slide in one of the trucks, the trucks and bed being also usually provided with male and female circle-plates e^1 e^2.

From the shaft G of the brake-wheel, which is journaled on the forward part of frame A, extends a rod or chain, g^1, to which are connected levers or crank-arms g^2, secured to the upper ends of the king-bolts e, while to the

lower end of the king-bolts are attached levers g^3, which operate the brakes through chains g^4, the whole constituting a brake mechanism in some respects similar to that employed on rail-road-cars, and which, or like brake mechanism, should be employed with my trucks.

Secured to the forward truck, and centered with the king-bolt thereof, is a toothed segment, h, which gears with a pinion, (or worm,) h', on the lower end of shaft H on the forward part of main frame A, said shaft being provided with a hand-wheel, by means of which the shaft is turned to the right or left, according to the direction in which the machine is to be directed.

The engine or engines for imparting motion to the crank-shaft B may be of any well-known class, or as shown at p p, and are secured in a bed, P, with guides p' fixed on the frame or bed A. The boiler R, which is usually an upright, is preferably placed forward of the engines, so as to bring the engineer within reach of the brakes and steering mechanism, and the pump S (or injector, as the case may be) is placed forward of the boiler, between which and the tubular frame water-tank suitable connections are made. Provision is also made for filling the tank or frame.

The operation of my devices is as follows: The engines being started impart motion to crank-shaft B, which, through cams b and cranks b^1, reciprocate the horizontal driving-bars c c', dragging forward the pushers or legs d d^1 with the forward motion of the bars, the hoofs thereof biting the ground on the reverse stroke, causing a thrust or advance of the carriage. As the bars c c' move in opposite directions at each revolution of the shaft, the motion of the carriage is continuous and even.

When it is desired to back the vehicle the arms d are raised and locked up by mechanism d^4 d^5, and the universal-jointed arms d^1 are reversed or thrown forward, as indicated in dotted line. Upon releasing mechanism d^4 d^5 the springs d^3 will throw the pushers or legs d against the ground.

When the machine is to be used as a fixed power the driving-bars c c' are detached from the crank-shaft B, and belts slipped upon pulleys b^2.

The driving mechanism may be mounted in winter upon bob-sleds instead of trucks, the same steering mechanism being retained, and the sleds connected to the main frame or bed in the same manner as the trucks.

The advantages of operating the driving-bars from an elevated crank-shaft are twofold: first, when said bars are detached, the power-shaft stands free and clear for use as a fixed motor; and, secondly, when the driving-bars are attached to and operated from an elevated crank-shaft, the motion imparted to the jointed end of the pusher or leg is multiplied in the ground end, adding to the length of stroke or step, and consequently to the speed of the vehicle.

By notching the hoof or foot the same is readily lifted on muddy ground, by which means the operative mechanism is relieved of much strain, and can be made light and ornamental.

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

1. The combination, in a road-motor, of the crank-shaft, provided with one or more cams and crank-arms, the horizontal pivoted driving-bars, and suitable legs or pushers hinged to the driving-bars, substantially as and for the purpose specified.

2. In a road-motor, the combination, with a horizontal driving-bar, of two or more legs or pushers hinged thereto, provided with lifting and locking mechanism arranged on the driving-bar, substantially as and for the purpose specified.

3. In a road-motor, the pusher or leg, having the notched or slotted hoof or foot, substantially as and for the purpose specified.

4. In a road-motor, the combination, with the bed, of two or more trucks pivoted thereto by king-bolts arranged in a central line, and connected by a jointed sliding coupling pole or perch, substantially as and for the purpose specified.

In testimony whereof I, the said GEORGE T. SNYDER, have hereunto set my hand.

GEORGE T. SNYDER.

Witnesses:

JAMES I. KAY,

C. S. HUNTINGTON.