

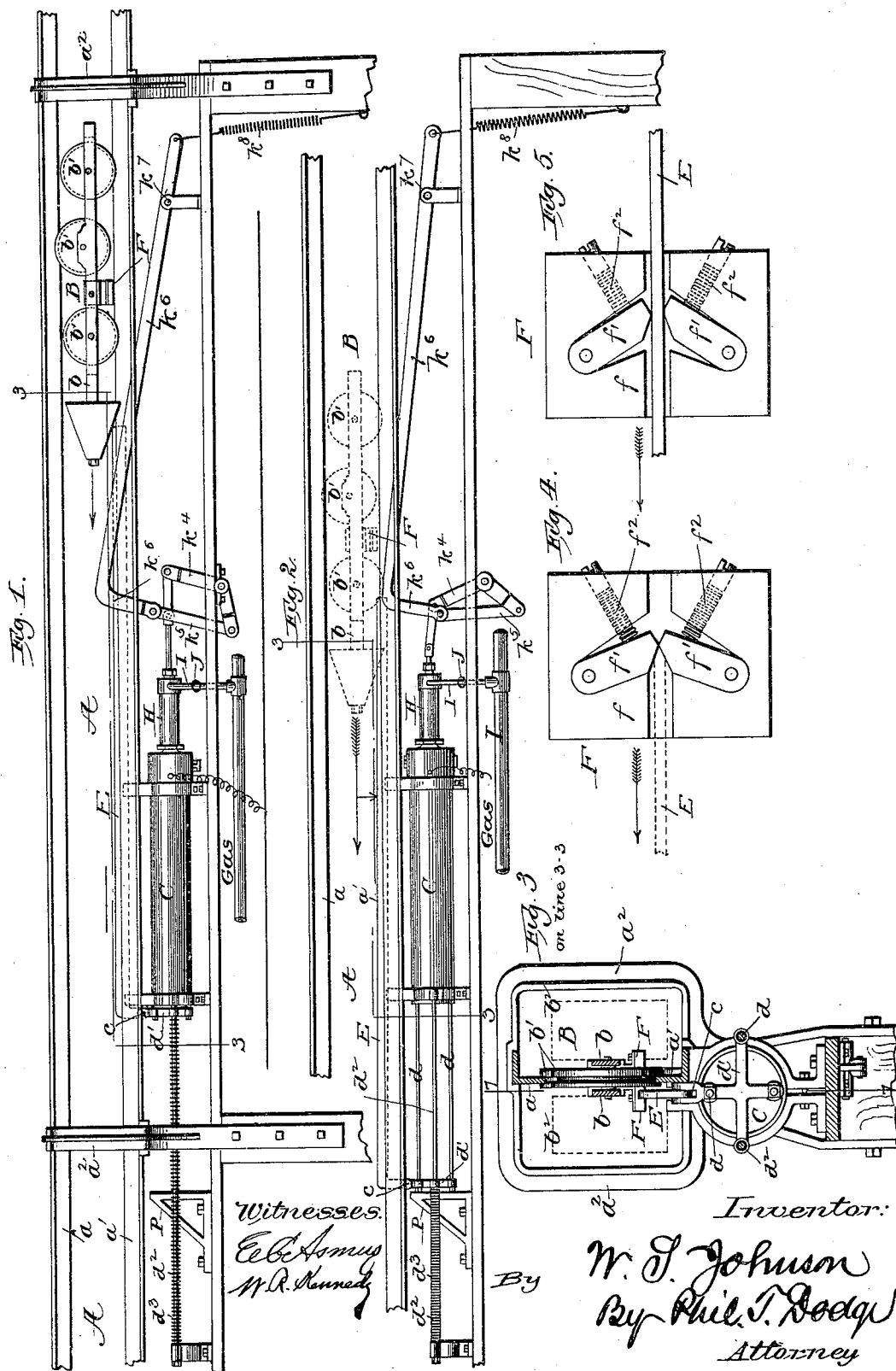
(No Model.)

2 Sheets—Sheet 1.

W. S. JOHNSON.
CAR PROPELLING SYSTEM.

No. 461,536.

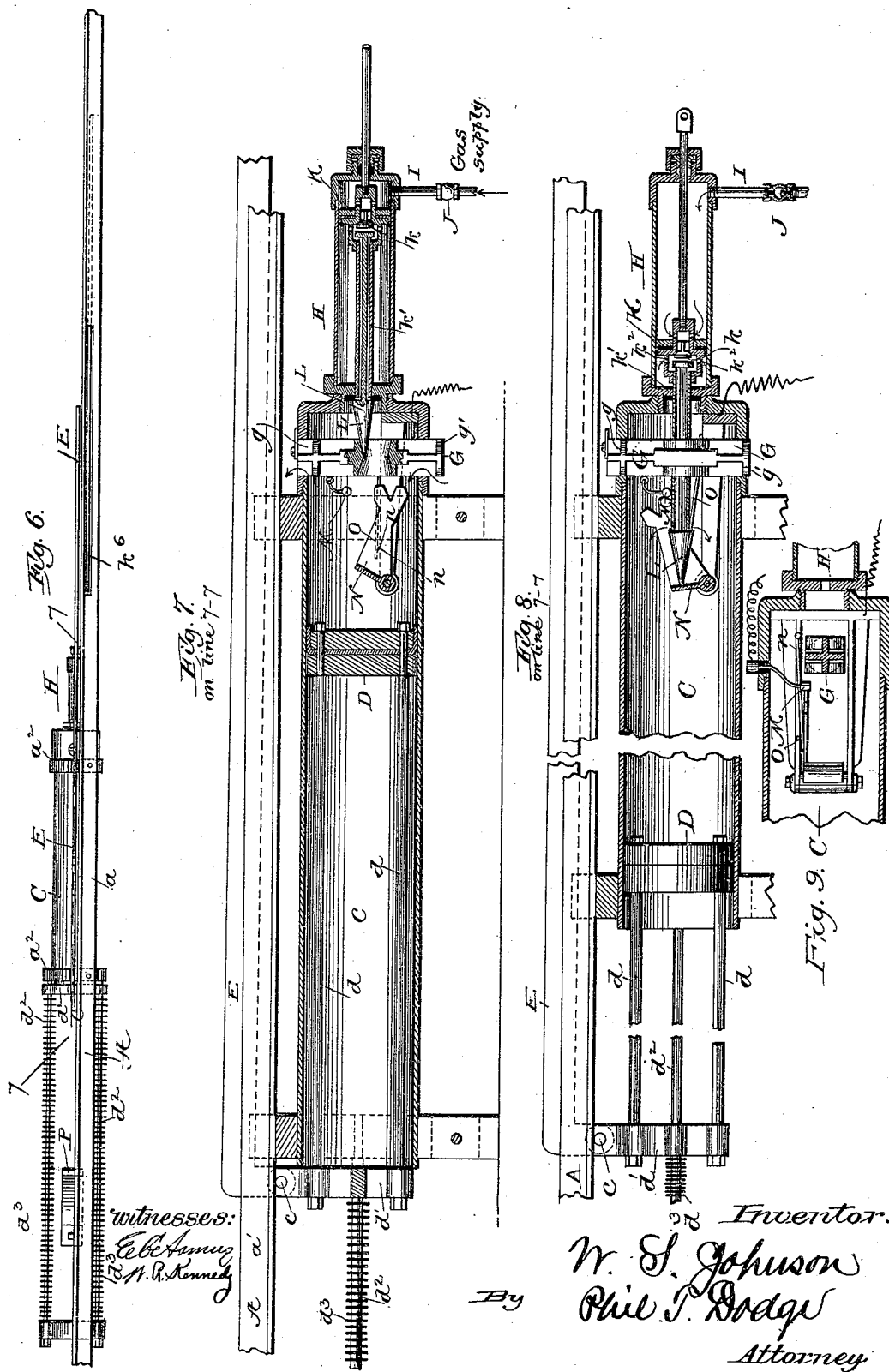
Patented Oct. 20, 1891.



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UNITED STATES PATENT OFFICE.

WARREN S. JOHNSON, OF MILWAUKEE, WISCONSIN.

CAR-PROPELLING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 461,536, dated October 20, 1891.

Application filed April 22, 1891. Serial No. 389,901. (No model.)

To all whom it may concern:

Be it known that I, WARREN S. JOHNSON, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain
5 Improvements in Car-Propelling Systems, of which the following is a specification.

The present invention relates to a system generically represented and claimed in my application for Letters Patent filed on the 6th
10 day of November, 1890, Serial No. 370,576, wherein a car or carrier traveling along a track or way is subjected automatically at suitable intervals to propelling impulses from stationary mechanisms, each comprising a cyl-
15 inder wherein a gaseous or other explosive charge is ignited and caused to advance a piston, which in turn acts through intermediate devices on the passing car. In said original application are represented cylinders through which the car travels, subject to the
20 direct action of the explosives confined behind them, and also cylinders and pistons arranged adjacent to the track, this second arrangement falling within the generic claims
25 of the patent, but not being specifically claimed. The present patent relates to and is intended to cover specifically this second arrangement, with the cylinders and pistons adjacent to the track.

The invention also includes various details
30 of construction designed to secure in an efficient manner the admixture of the explosive gas and air, the ignition of the charge, the discharge of the residual or spent gases from the cylinder, and the application of the im-
35 pulses effectively to the car, as will be hereinafter pointed out.

In the accompanying drawings, Figure 1 is a side elevation of a section of my track or
40 road with a car approaching one of the propelling mechanisms. Fig. 2 is a similar view with the propelling devices as they appear at the instant of completing their action on a car. Fig. 3 is a vertical cross-section on the
45 line 3 3, indicated in the other figures. Figs. 4 and 5 are plan views of the clutch or gripping device through which the car engages the propelling devices. Fig. 6 is a top plan view of the parts shown in Figs. 1 and 2.
50 Figs. 7 and 8 are vertical longitudinal sections through the propelling-cylinder and its

adjuncts on the line 7 7, Figs. 3 and 6. Fig. 9 is a horizontal section through the rear end of the cylinder, showing more particularly the
igniting devices.

Referring to the drawings, A represents a continuous track or way between the terminal
stations of the road. It may be constructed in any form and manner adapted to sustain
and guide the cars, but as herein shown con-
60 sists, simply, of two top and bottom rails a and a' , attached firmly to and sustained by frames a^2 , which may be mounted on posts or otherwise.

B represents one of the cars or carriers, 65 which may be made in any form and manner adapted to traverse the track, but which, as represented, consists of a skeleton frame b , provided with a series of sustaining and guiding wheels b' , grooved to embrace the rails, 70 and with side chambers or compartments b^2 to receive the articles to be transported.

C represents one of the series of propelling-
cylinders closed at one end, fixed horizontally in position adjacent to the track and contain-
75 ing a piston D, carrying two rods d , which are extended beyond the open end of the cylinder and attached to a cross-head d' , which slides on fixed guide-rods d^2 subject to the pressure
of spiral springs d^3 , which tend to push the
80 piston backward into the cylinder. The cross-head is jointed at c to a bar E, which lies alongside of the lower track or rail in guides which permit it to be reciprocated endwise
by the piston. Each car in advancing rides
85 over this bar E, and is provided on the under side with a clutch or grip F, arranged to straddle the bar, and so constructed that if the bar be thrust rapidly forward by the piston the clutch will engage and cause the car to
90 advance with the bar. The clutch may be variously constructed; but I recommend the simple construction shown in Figs. 4 and 5, in which f is a grooved block fixed to the car to straddle the propelling-bar E, and f' f' two
95 opposing vertically-pivoted dogs mounted on the block and urged toward each other by springs f^2 , so that while they permit the car to pass freely forward along and beyond the bar they will bite and lock the car and bar
100 together whenever the latter begins to move faster than the car. I propose to use in the

cylinder the well-known explosive mixture of carbureted hydrogen and air or other explosive compounds.

To effect the admission of the air into the combustion space or chamber in the rear end of the cylinder beyond the path of the piston, I provide a vertically-moving piston-valve G of a well-known type, having at its upper and lower ends pistons g g' to close openings in the top and bottom of the cylinder. When raised, the valve closes the two holes, as in Fig. 8, but when lowered, as in Fig. 7, after the explosion it opens both holes, allowing the residual or spent vapors to escape through the top opening, while fresh air enters at the bottom to fill the chamber.

To the rear end of the cylinder I secure the pump-cylinder H, into the outer end of which the gas is admitted from any suitable source through pipe I and check-valve J. In cylinder H is mounted piston K, with an inwardly-opening valve k , and with a tube k' surrounding the valve and extending tightly through the intervening cylinder-head into the combustion-chamber. Tube k' has rear lateral openings k^2 , so that as the piston is retracted the gas passes through valve k and opening k' and fills cylinder H. When, however, the piston advances, the valve k closes, and the gas is driven forcibly through openings k^2 and tube k' into the combustion-chamber, where it is thoroughly mingled with the air therein. Within the piston-tube k' is mounted a spindle having at the forward end a conical head L, which serves, first, as it is advanced with the piston to enter a hole in the air-valve G and close the same, and, second, at the time of the explosion to seat itself against and close the forward end of tube k' , so that the gases cannot pass back into the pump-cylinder. After the air-valve is raised it is held by the tube k' advancing there-through, as shown in Fig. 8, until the pump-piston again retreats after the explosion.

Various means may be used to operate the pump; but I prefer to connect its piston-rod, as in Figs. 1 and 2, through an elbow-lever k^4 and link k^5 to a track-lever k^6 , pivoted at k^7 and acted upon by a spring k^8 , which holds it normally in an inclined position in the path of the advancing car, as shown in Fig. 1, so that as the car advances and before it reaches the impelling-point it depresses the track-lever and thus causes the air-valve to be closed and the gas to be driven into the explosion-chamber of the main cylinder. As the impulsive action on the car is completed its rear end advances beyond and releases the track-lever, thereby allowing the lever and pump-piston to retreat under the influence of spring k^8 and the air-valve to fall to an open position. The ignition of the charge may be effected by an electric spark or by a flame through any suitable means.

As shown in the drawings, M is an insulated electrode entering the combustion-chamber

from a battery, dynamo, or other source of electric supply, and N a second electrode or circuit-closer in the same circuit pivoted in the combustion-chamber and notched or serrated at its free end, so that in swinging up and down it will repeatedly open and close the circuit and produce an igniting-spark. It falls by gravity, but is raised as the pump completes its action by the valve-head L striking it above the center, as in Fig. 8. The circuit may be completed from N through the cylinder to which the conductor will be attached. In order to insure the passage of the current to the electrode N and also to insure its fall, I prefer to provide a conducting-spring O, fixed at one end in the combustion-chamber and bearing at the other on a pin n on the side of N.

The cylinder, pump, piston, and their adjuncts, as above explained, constitute, jointly, a propelling or impulse mechanism. There will be a suitable number of these mechanisms located at different points along the road at intervals such that the impulse received by the car from one mechanism will cause it to travel forward to the next, or, if desired, as a matter of precaution, to the second mechanism beyond. The car, being in this manner subjected to frequent and powerful impulses, is caused to travel over the road automatically and at high velocity. The distance between the stations or propelling mechanisms will be longer or shorter, dependent upon the road being level or at a greater or less inclination and upon other modifying circumstances. By properly adjusting or proportioning the parts the strength of the impulse at each station may be controlled as economy and efficiency may demand.

Collisions between cars on my road are practically impossible, for the reason that if the car is retarded so that it is nearly overtaken by another the second car will reach the propelling mechanism before the spent gases are wholly discharged from the cylinder, and consequently the new charge diluted and weakened in effect by the residual gas will impart to the second car an abnormally-feeble impulse, thus reducing its speed and giving the antecedent car time to quicken its speed. This action occurring repeatedly gives the first car time to regain its position. In this manner the distance between the cars is rendered self-controlling to such an extent as to prevent accidents.

In order to prevent the pistons from being blown out of the main cylinder in the event of an exceptionally strong explosion or light resistance, I provide a stop or abutment P in any suitable form and position.

Having thus described my invention, what I claim is—

1. In combination with a track or way and a car movable thereover, a cylinder adjacent to the track, a piston therein, intermediate devices through which the piston acts to ad-

vance the passing car, and means actuated by the car for admitting an explosive charge to and igniting it within the cylinder.

2. A track and a car provided with a clutch and movable over the track, in combination with a cylinder adjacent to the track, a piston having a longitudinal bar attached for the clutch to engage, a spring connection to return the piston, a gas-introducing mechanism and igniting mechanism, and a device acted upon by the car to effect the introduction and ignition of the gas.

3. In a car-propelling mechanism, and in combination with the cylinder and car-propelling piston, a pump to introduce gas, a valve to permit the outflow of the spent gases and the inflow of air, an igniting device, and means for operating said parts from the passing car.

4. In combination with the cylinder and piston, the cylinder-valve to admit air and discharge the spent gases, the pump-cylinder, the pump-piston with its tube and rear valve to deliver exclusively into the main cylinder, the front valve carried by the tube and

arranged to actuate the cylinder-valve, and the igniting device also actuated by said front valve.

5. In combination with a track and a series of cars movable thereover, a series of propelling mechanisms distributed along the track to act successively on the passing car, each of said mechanisms comprising a cylinder, a piston, and devices through which it actuates the passing cars, and means actuated by the car for introducing and igniting gas and controlling the discharge of the spent gases, whereby each car is subjected to successive impulses and a car following another subjected to feeble impulses from diluted charges in the event of its following in dangerous proximity to a preceding car.

In testimony whereof I hereunto set my hand, this 14th day of March, 1891, in the presence of two attesting witnesses.

WARREN S. JOHNSON.

Witnesses:

W. H. RICHARDSON,
W. D. BRISTOL.