(No Model.) 2 Sheets—Sheet 1.

W. H. PHILLIPS.

CARRIAGE ACTUATING MECHANISM.

No. 464,587. Patented Dec. 8, 1891.

FIG. 1.

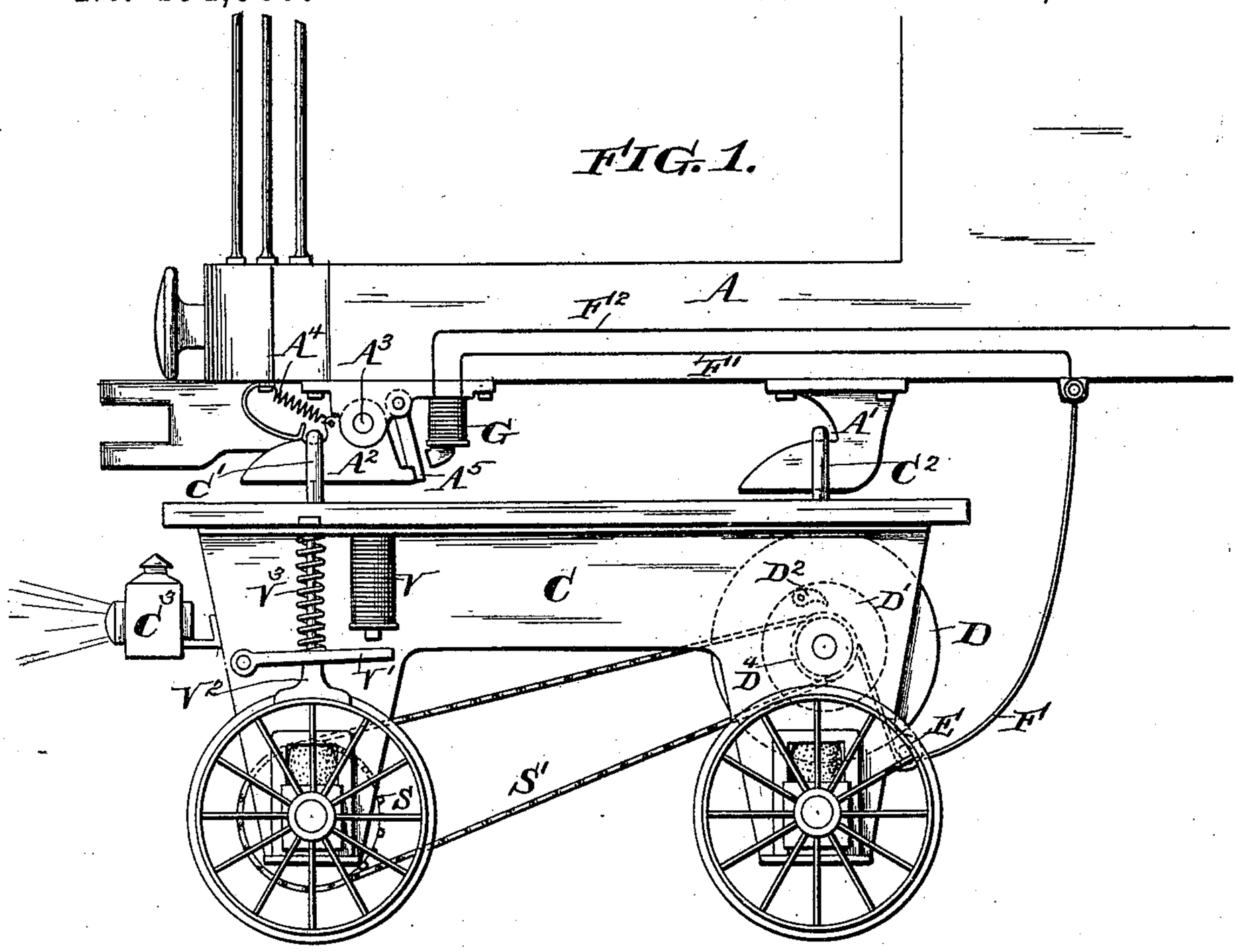
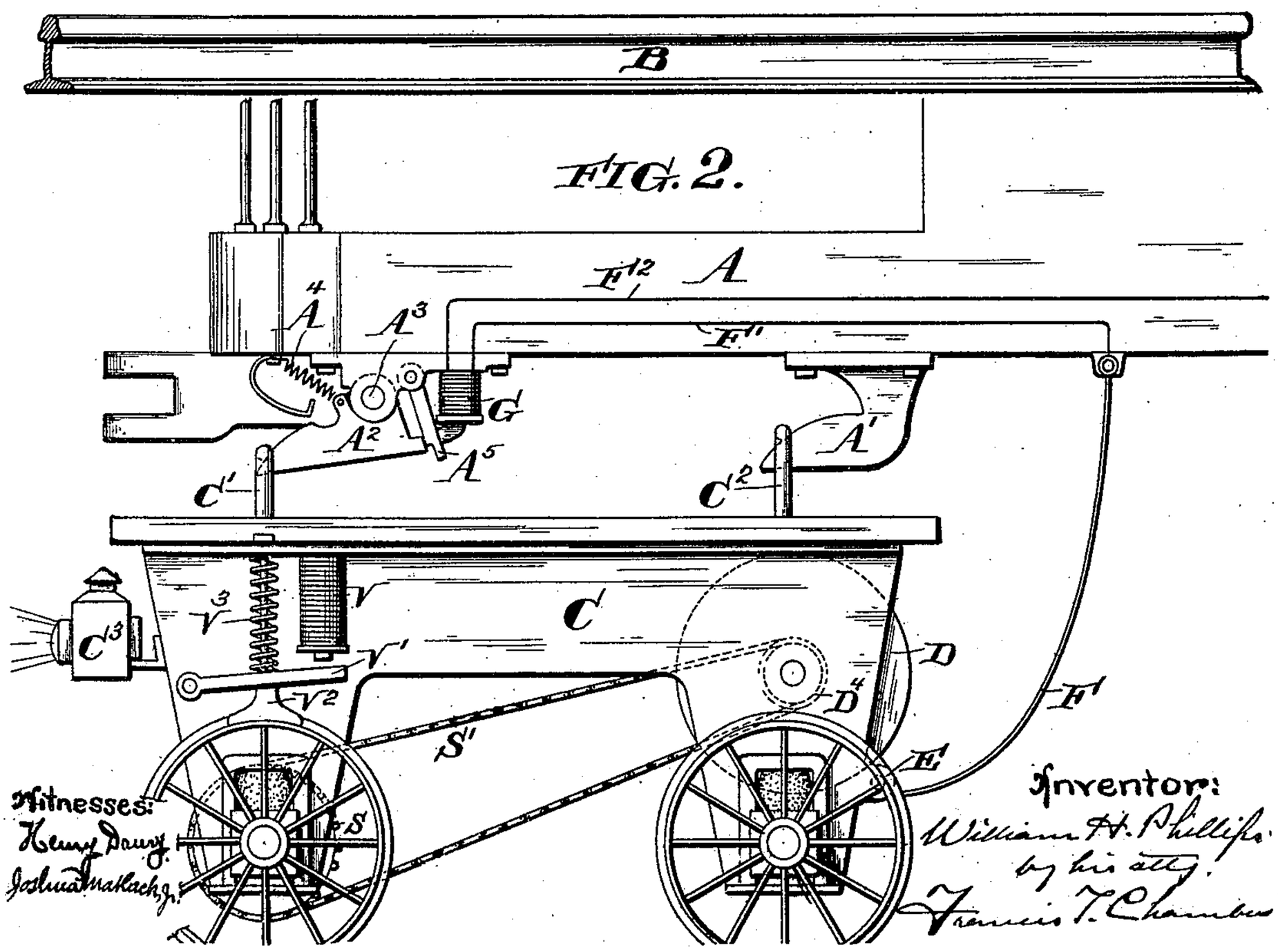


FIG. 2.



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(No Model.) 2 Sheets—Sheet 2.

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FIG. 5.

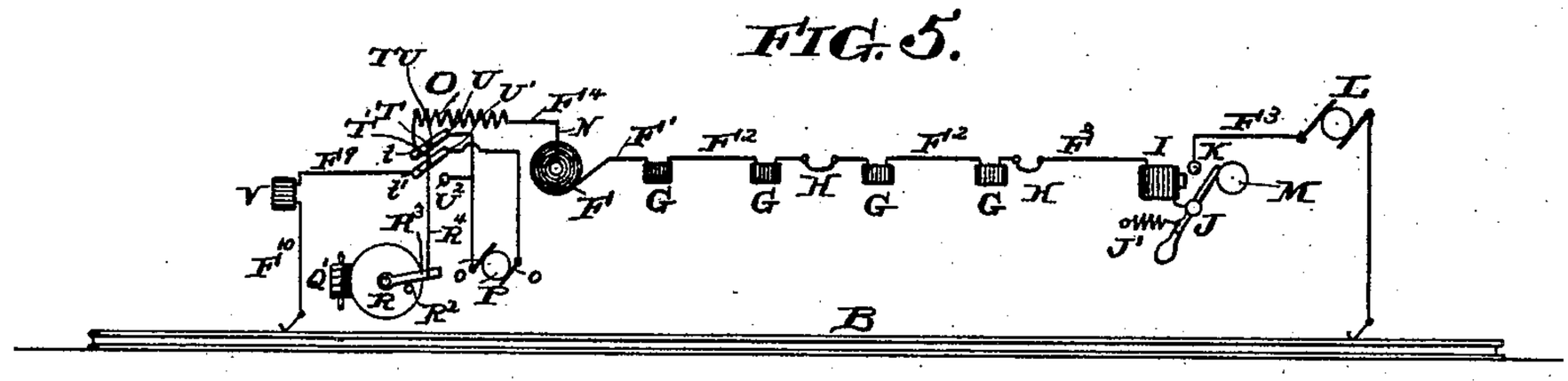


FIG. 3.

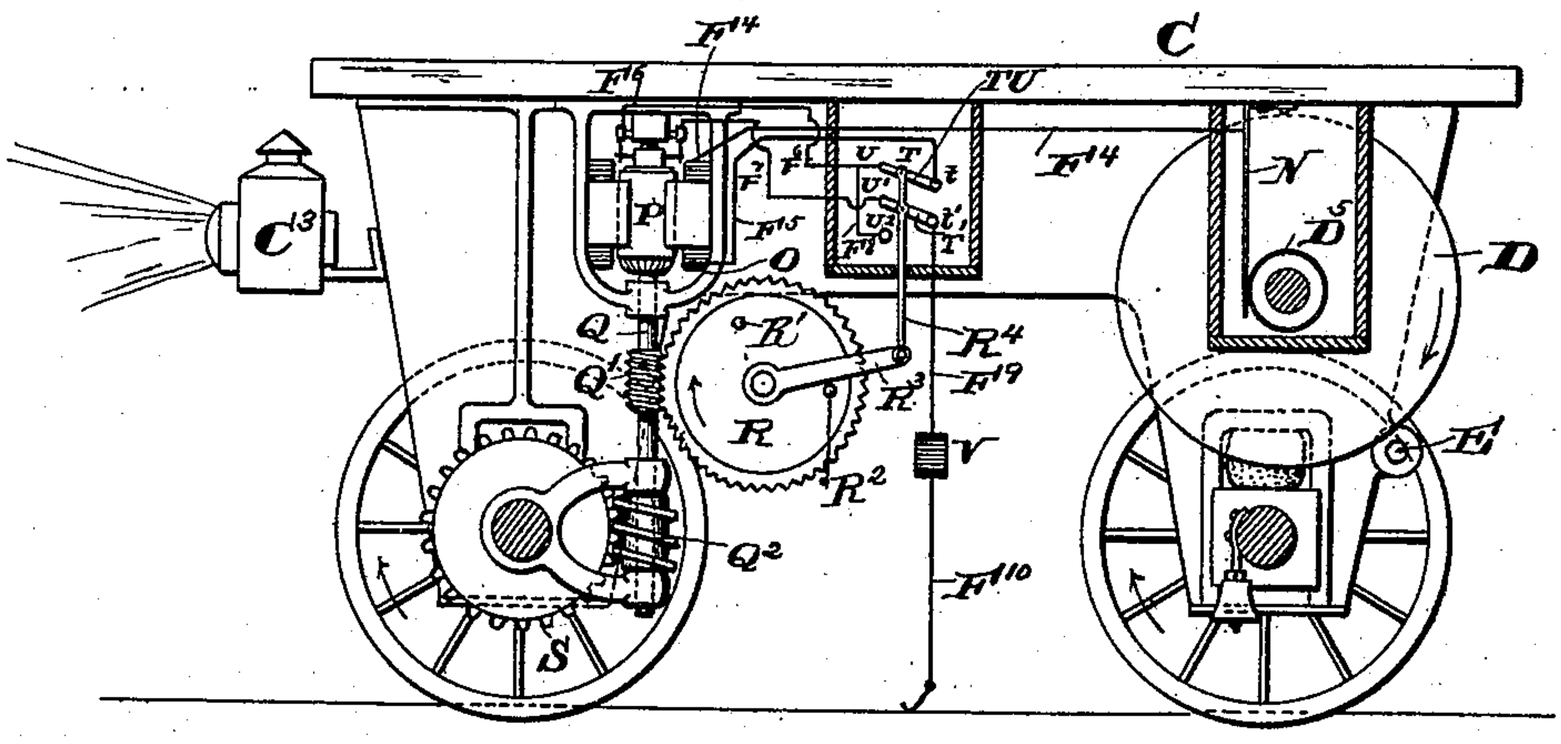


FIG. 4.

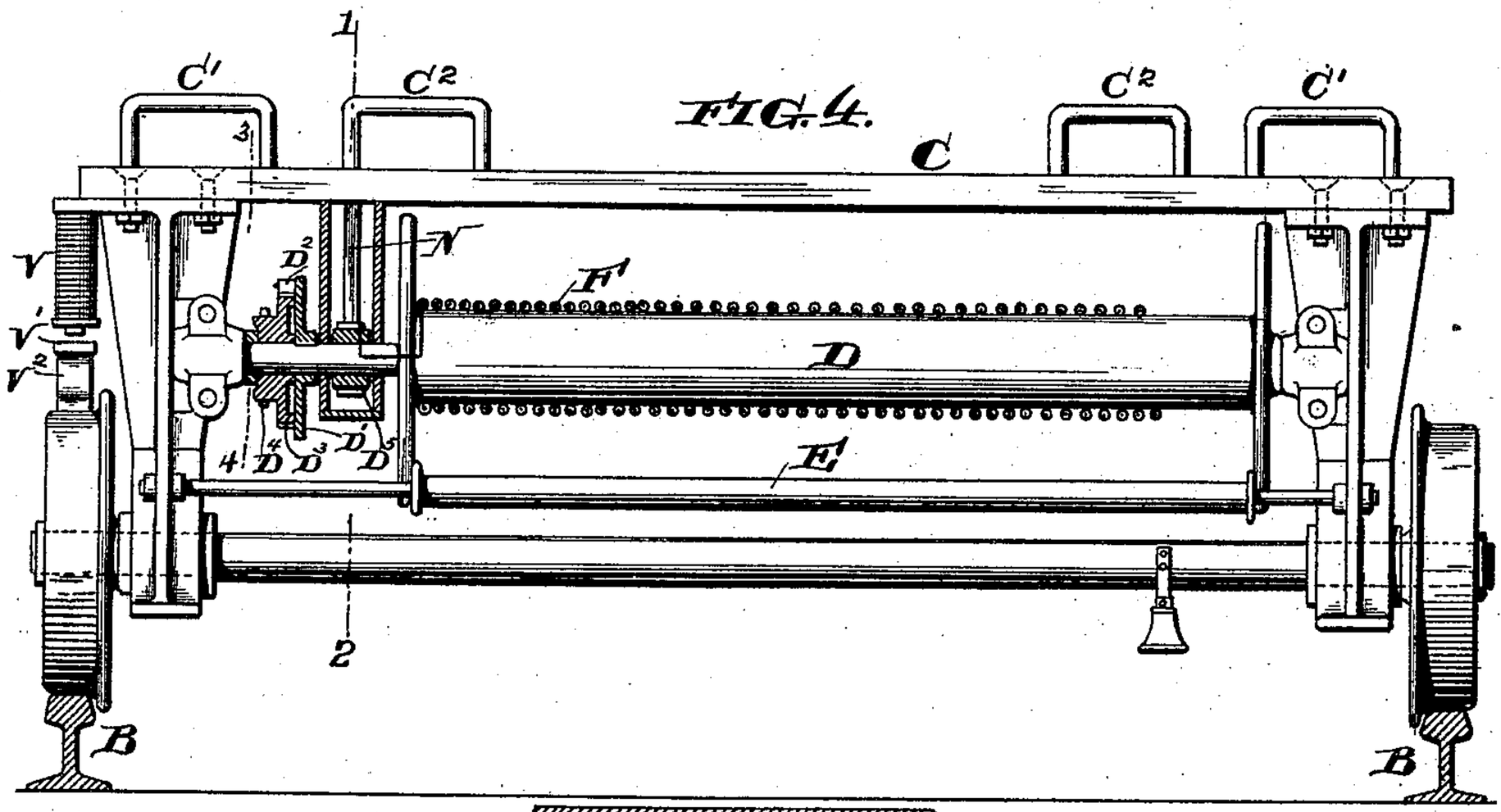
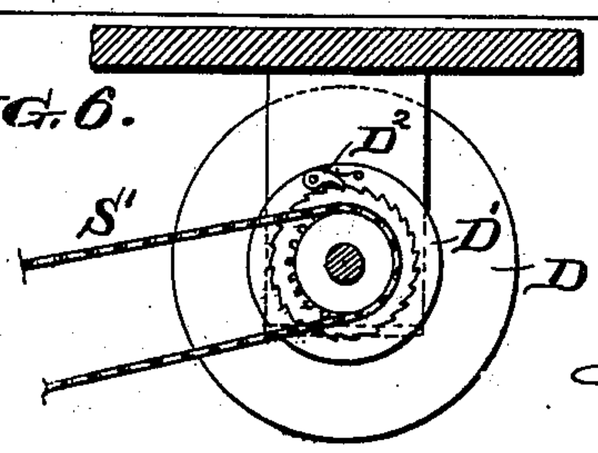


FIG. 6.



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UNITED STATES PATENT OFFICE.

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CARRIAGE-ACTUATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 464,587, dated December 8, 1891.

Application filed February 2, 1891. Serial No. 379,889. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PHILLIPS, of Jenkintown, county of Montgomery, State of Pennsylvania, have invented a certain new and useful Carriage-Actuating Mechanism, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to mechanism for actuating and automatically controlling the movement of a car, or, indeed, any wheel or floating carriage, and particularly it is designed for actuating a light railway-car adapted to be held at the rear end of the train and to be propelled backward with respect to said train when desired, so as to take the place of the brakeman who is sent back to guard the rear end of a railway-train.

The nature and mode of operation of my invention will be best understood as described in connection with the drawings, in which I have illustrated it in what I believe to be its most convenient and desirable form, and in which—

Figure 1 is a side elevation of a signal-car carried beneath the rear platform of a passenger-car; Fig. 2, a similar view showing the way in which the signal-car is dropped upon the railway-track when it is desired to send it back along the track. Fig. 3 is a sectional side elevation of the car, taken on the line 1 2 of Fig. 4. Fig. 4 is a rear elevation of the car, partly in section. Fig. 5 is a diagram illustrating the electric connections with my preferred mode of construction, and Fig. 6 a cross-sectional view on the line 3 4 of Fig. 4.

A is the rear platform of a railway-car, to the bottom of which are secured two sets of hooks A′ and A^2. The hooks A′ are fixed, and the hooks A^2, which are nearest the end of the car, are pivoted at A^3, provided with a spring A^4, which normally holds them up in the position shown in Fig. 1, and a latch A^5, which engages a heel extension of the pivoted hook and holds it up as long as the latch remains engaged.

C is the signal-car provided with wheels adapted to rest and run upon the track B and having iron staples C′ and C^2, placed so as to engage the hooks A′ and A^2. The height of the staples above the track when the car is resting thereon is such that they will come above the points of the hooks A′ and A^2, and the impetus of the car (supposing it to be running backward toward the train) will cause it to run up the incline face of the hooks until it is lifted from the track and held in the position shown in Fig. 1.

Referring next to the electric connections, (which are best illustrated in Fig. 5,) I place upon the train, preferably in the locomotive, a dynamo L, from which extends a circuit-wire F^3, which is thrown into connection with a circuit F^2, extending through the train by means of a pivoted switch J. This switch-lever J is connected to the circuit-wire F^2 through an electro-magnet I, and when the end of the switch is brought in contact with the stop K at the end of the circuit F^3 the switch is within the magnetic field of the magnet and is held in contact with the post K until the current is broken. The spring J′ is provided to normally draw the switch away from post K and throw its end against a bell-stop M, the result of this arrangement being that when the current is broken in the circuit-wire the switch J will leave its contact with the post K and will strike against the bell-stop M, thus giving an audible notice of the breaking of the circuit. In the circuit-wire F^2, H H, &c., indicate couplings between cars, and G G, &c., electro-magnets which are placed in the circuit beneath the platforms of the cars and close to the latches A^5, which hold the hooks A^2 in position. (See Figs. 1 and 2.) Referring to these figures, it will be seen that when a current is passing from the wire F^2 through magnet G to the wire F′ the latch A^5 will be attracted by the magnet and drawn back, as shown in Fig. 2, so as to disengage the hook A^2. The weight of the car dependent on the said hook will then draw it down, as shown in said figure, permitting the car to rest upon the track B in readiness to travel backward with respect to the train.

The wire F′, which is a continuation of the wire F^2, is coupled to a wire cable F, which cable is wound upon a drum D, carried upon the car C. In my preferred construction this drum D is secured to an axle, which is loosely journaled in bearings on the car and to which axle a ratchet-wheel D′, Figs. 4 and 6, is firmly secured. Adjacent to this ratchet-wheel is a

sprocket-wheel D^4, turning freely on the axle of the drum D and having an extension D^3, which supports a pawl D^2 in engagement with the ratchet D'. The sprocket-wheel D^4 is, by means of a drive-chain S', engaged with an axle of the car, (see Figs. 1 and 2,) and the effect of the arrangement above described is that when the car is running backward with respect to the train the drum D will turn freely, permitting the cable F to unwind and lay along the track as the car moves backward. When, however, the motion of the car is reversed, the drum is directly driven from the axle of the car through the chain S', sprocket-wheel D^4, pawl D^2, and ratchet D', the pawl then engaging the ratchet and of course causing the drum to turn with the sprocket-wheel. In this way the cable is picked up from the track and rewound upon the drum as the car moves backward toward the train. The cable F is electrically connected with the hub D^5, (see Fig. 4,) which is in contact with a connection or brush N, said brush being in turn connected with a circuit-wire F^4.

Upon the carriage C is secured a motor, which is engaged with an axle or axles of the car so as to drive them, and which motor or parts of it are so connected with the circuit-wire supported on the car that the passage of a current through said circuit in one direction will cause the motor to move the car backward, in the other direction will cause the motor to move the car forward, while the interruption of the current will arrest the motion of the motor. This connection may be made in various well-known ways, the most convenient of which, however, will, I believe, be that illustrated in my drawings and which I will hereinafter describe.

A very important part of my device is the switch by which the current is interrupted and reversed and its connection with the motor or parts actuated thereby in such a way that the interruption and reversal of the circuit will take place for a certain determined number of revolutions of the motor or of the car-wheels, so that when the circuit-wires above described are thrown in connection with the dynamo the car will travel backward for a determined distance, then automatically break the circuit and move the switch so as to reverse the circuit connections, so that when the dynamo is again thrown into connection the motor will be actuated in the reverse direction, causing the car to move backward until it hooks itself up beneath the platform of the passenger-car; and another important practical detail consists in providing a spring-actuated brake which will normally press against the wheel or wheels of the signal-car and combining with it an electro-magnet situated in the circuit and which, when the current is passing, will draw the brake away from the wheel, permitting the spring to return it to contact therewith as soon as the current is interrupted.

Referring now again to the drawings, which illustrate my preferred construction, it will be seen that the wire F^4 is in electrical connection with the field O of an electric motor, passing through which it connects by wire F^5 with the switch T U. This switch consists of two pivoted levers T and T', pivoted and electrically connected at the points *t* and *t'* with wires F^5 and F^9. In normal position the levers T and T' rest against yielding stops U and U', the first of which connects through wire F^6 with the armature P of the motor, with which armature a return-wire F^7 connects the electric stop U'. A third stop U^2 is connected by a wire F^8 with the wire F^6. It will be seen that by this contrivance the movement of the switch-levers T and T' downward, so that switch T will rest on stop U' and switch T' upon stop U^2, will reverse the current passing from the connections described from wire F^5 to wire F^9, the current being, however, broken before the connections are reversed.

The armature P of the motor drives a shaft Q, which in the plan shown is provided with a worm-gear Q^2, engaging with a worm-wheel S on the axle of the car C. The shaft Q also carries a worm Q', which engages with and drives a wheel R, said wheel having stop-pins R' and R^2, secured upon its side, and a lever R^3, secured upon its axle and extending between the stop-pins. The lever R^3 is connected with the switch-levers T and T' by means of a rod R^4, and it will be seen that as the shaft Q revolves the wheel R will gradually turn until its pin R' comes in contact with the lever R^3, pressing it down and causing the switch-levers T and T' to also move downward until they break contact with the stops U and U', upon which they rest. The weight of the switch-levers and lever R^3 will then cause the switch-levers to come into contact with the stops U' and U^2, thus reversing the connection. The breaking of the current, however, previous to the reversal of the connection causes the electro-magnet I to release the switch-lever J, which flies back into contact with the bell-stop M, breaking the circuit extending to the dynamo and giving audible notice to the engineer of the fact. At the same time the motion of the motor is arrested and the spring-brake V^2 applied to the periphery of the wheel of car C. This last braking operation has been already referred to, and by examining the drawings it will be seen that the brake V^2 is held in contact with the wheel by the action of a spring V^3. A lever V', attached to the brake, extends beneath the poles of an electro-magnet V, which is situated between the parts F^9 and F^{10} of the circuit-wire. As long as the current is passing through the wire, the magnet V, acting through the lever V', will overcome the force of spring V^3 and hold the brake away from the wheel of the car; but as soon as the current is interrupted the spring will force the brake down against the car-wheel. It will be seen that as soon as the engineer

again moves the switch J to connect the circuit-wires F^3 and F^2 the circuit will be again restored, but the direction of the current through the switch and motor will be reversed, so that the motor will be actuated in the opposite direction to that in which it was first moved and will cause the car to return to the point from which it originally started. The arrangement of the pin R^2 is such that at or immediately before the time when the car is picked up on the hooks A′ and A^2 it will lift the lever R^3 on the switch-levers T and T′, thus again breaking the circuit and restoring the original contact between the switch-levers T and T′ and the stops U and U′.

E is a loosely-journaled roller or drum under which wire F passes from drum D; C^3, a lantern at the front of the car C, and on the axle (see Figs. 3 and 4) I have shown a bell attached, which, turning with the axle, rings and gives an audible signal of the approach of the carriage.

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

1. The combination, with an electric generator and a circuit leading therefrom, of a switch J, normally held open, an electro-magnet I, arranged in the circuit to hold the switch closed, a car C or its equivalent, a drum D, carried on said car, a conduit-wire F, wound on said drum and electrically connected with a wire F^4 on the car and with the circuit from the generator, a motor carried on the car and geared to drive the same, a switch connected with wire F^4 and with the motor, said switch being adjustable, so as to reverse the current in the motor connection, and gearing actuated by the motor and connected with the switch to break the circuit and reverse the switch after the motor has made a determined number of revolutions.

2. The combination, with an electric generator and a circuit leading therefrom, of a switch J, normally held open, an electro-magnet I, arranged in the circuit to hold the switch closed, a bell-stop M, arranged opposite said electro-magnet, a car C or its equivalent, a drum D, carried on said car, a conduit-wire F, wound on said drum and electrically connected with a wire F^4 on the car and with the circuit from the generator, a motor carried on the car and geared to drive the same, a switch connected with wire F^4 and with the motor, said switch being adjustable, so as to reverse the current in the motor connection, and gearing actuated by the motor and connected with the switch to break the circuit and reverse the switch after the motor has made a determined number of revolutions.

3. A car A, having at its ends a hook or hooks A′ and a pivoted hook or hooks A^2, arranged to engage and hold a car, as C, in combination with a latch A^5, arranged to hold the pivoted hook, an electro-magnet G, arranged to draw the latch when a current passes through it, and a spring, as A^4, arranged to hold the pivoted latch up, all substantially as and for the purpose specified.

4. The combination, with a car C or its equivalent, of an electric motor geared to drive said car, a circuit connecting with the motor, a switch arranged to break and reverse the current in the motor, and gearing actuated by the motor and connected with the switch, as described, so as to break and reverse the current at a given time.

5. The combination, with a car C or its equivalent, of an electric motor geared to drive said car, a circuit connecting with the motor, a spring-brake arranged to act upon the wheels of the carriage, an electro-magnet situated in the circuit and arranged to withdraw the brake from the wheels, a switch arranged to break and reverse the current in the motor, and gearing actuated by the motor and connected with the switch, as described, so as to break and reverse the current at a given time.

6. The combination, with an electric generator and a circuit leading therefrom, of a switch J, normally held open, an electro-magnet I, arranged in the circuit to hold the switch closed, a car C or its equivalent, a drum D, carried on said car, a conduit-wire F, wound on said drum and electrically connected with a wire F^4 on the car and with the circuit from the generator, a switch in the wire circuit of the car arranged to break the circuit and reverse its connection, and gearing, as described, connected with the car-wheels and the switch, whereby the switch is moved, the current broken, and connections reversed after a determined number of wheel revolutions.

7. In combination with a car C, having a motor geared to its driving-wheels, an electric circuit and means for breaking and reversing the circuit, as described, a loosely-journaled drum D, having secured on its axle a ratchet-wheel D′, a sprocket-wheel D^4, loosely journaled on said axle and provided with a pawl D^2, arranged to engage the ratchet, and a drive-chain S′, connecting the driving-axle of the car with wheel D^4, all substantially as described, and so that the drum will be positively driven when the car is running backward.

8. The combination, with a car C, having a motor, and controlling electric circuit, as described, of a wheel R, driven by the motor and having pins R′ R^2, a lever R^3, arranged between said pins, a ratchet T U, situated in the circuit, and connections from lever R^3 to said switch, as described, whereby the current is broken and the connections reversed after the motor makes a given number of revolutions.

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