(No Model.)

R. P. GARSED.

Automatic Railway Switch.

No. 241,206. Patented May 10, 1881.

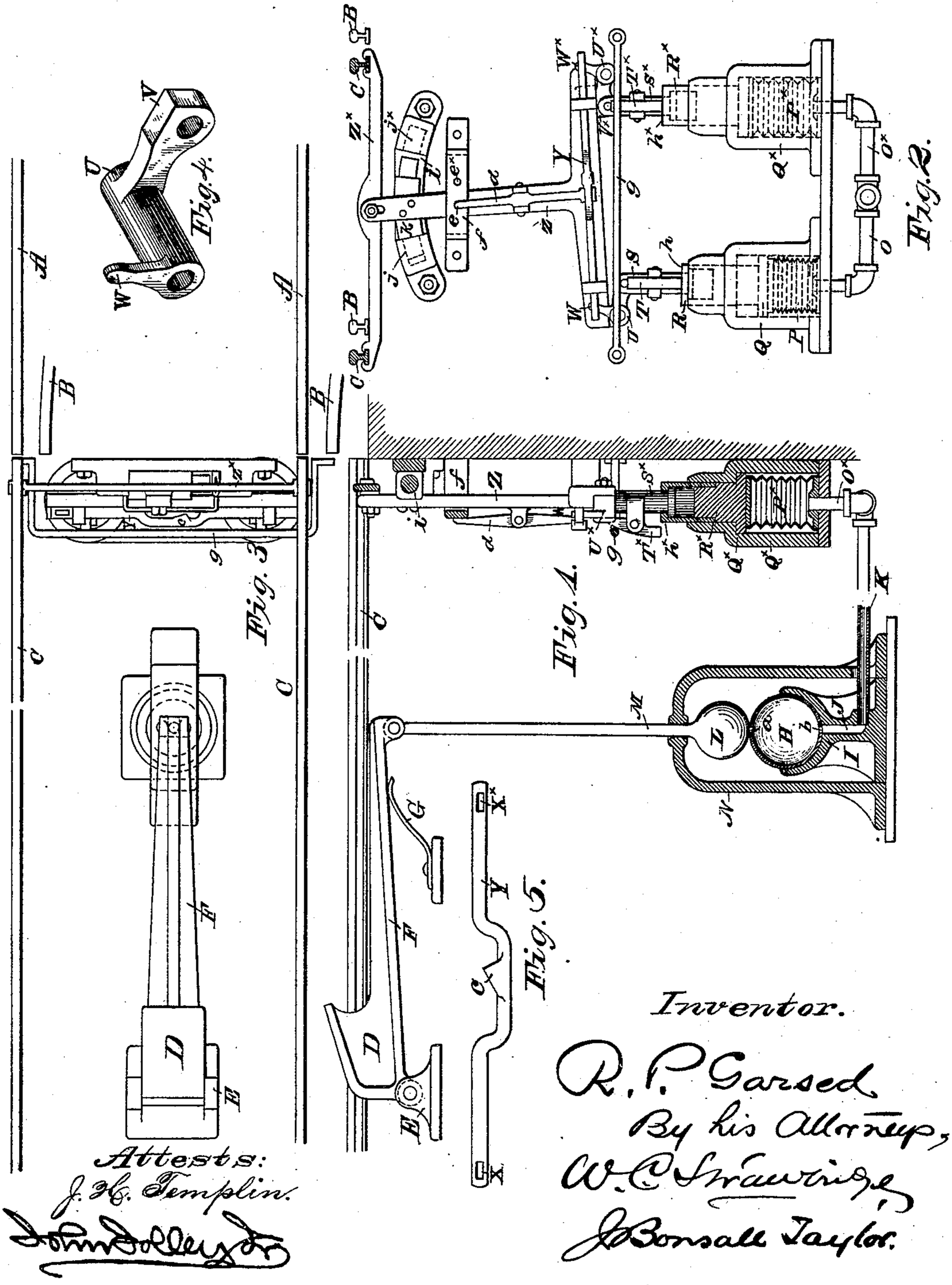

Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 241,206, dated May 10, 1881.

Application filed December 20, 1880. (No model.)

To all whom it may concern:

Be in known that I, ROBERT P. GARSED, of Norristown, in the county of Montgomery and State of Pennsylvania, have invented an Improvement in Automatic Railway-Switches, of which the following is a specification.

My invention relates, in general, to certain novel mechanism for automatically operating railway-switches directly from the engine or from a car of a moving train.

It further relates to means for locking the switch when shifted and automatically unlocking it prior to shifting, and finally relates to means for preventing severe concussion, jarring, or injury to the mechanism of the switch.

My invention relates, more specifically, to the operation of an air or fluid pump by the action of a moving train, and to the transmission of the power of air or fluid therefrom to the rapid and certain operation of mechanism connected with the rails of a switch or crossing.

My invention consists in the mechanism hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents, in vertical sectional elevation, a switch constructed in accordance with and embodying my invention. Fig. 2 is a vertical front elevation of the cylindrical bellows, switch-lever, and connecting attachments; Fig. 3, a top-plan view of the apparatus of Fig. 1; Fig. 4, a perspective detail of the lock-operating crank, and Fig. 5 a plan view of the slide-bar.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings, A represents the rails of the main track, B the rails of the side track, and C the rails of the switch.

D F is a pump-depressor, located between the switch-rails, and consisting of an inclined plate, D, pivoted at E in a socket beneath the road-bed, and of a lever-arm, F, laterally extending therefrom and supported upon a spring, G, substantially as shown.

Located in a pit beneath the road-bed is an air or fluid pump, consisting of a rubber sphere, H, mounted and securely seated in a hemispherical metal cup or holder, I, which retains the sphere in place, and prevents its rupture under the action of its operating plunger. The sphere has an orifice, *a*, at the upper extremity of its vertical axis, and an orifice, *b*, at the lower extremity thereof. The holder I connects by means of the hollow core J with a line of pipe, K, and with the orifice *b* of the pump.

L is a ball-plunger, affixed to the lower extremity of a plunger-rod, M, connected with the outer end of the lever-arm F of the pump-depressor. The plunger is held in line over the sphere H by passing through a box or like support in the cover-plate of a casing, N, inclosing the pump mechanism.

The action of the above device is this: A suitable cylinder or other device, carried beneath an engine or tender, (or a car, if desired,) and under the control of the engineer, is caused, in the movement of the train, to encounter the depressor-plate, so that said plate, the lever-arm, plunger-rod, and plunger are forced violently down with the result that the upper orifice of the pump is closed by the plunger, and the latter caused to bury itself in the pump, so as to invert or double the latter within itself until the plunger rests upon such doubled sphere, within the hemispherical holder thereof, with the further result that all the air in the pump is violently expelled from it and forced through the line of pipe K. The line K at the required distance, and in a pit beneath the switch-points, branches into the pipes O $O^{\times}$, which communicate, respectively, with cylindrical bellows P $P^{\times}$, embraced within suitable casings, Q $Q^{\times}$, in such manner that air or fluid forced through the line K acts equally to cause the expansion of both bellows, under the restriction on one of the bellows, however, imposed by the trigger which happens to be set, and of the devices connected therewith, as more fully explained hereinafter.

Suitably supported within extensions of the casings Q $Q^{\times}$ are primary pistons R $R^{\times}$, the heads of which are superimposed upon the bellows within the casings, while the upper extremities thereof are hollowed to contain the heads of secondary pistons S $S^{\times}$, and to allow of a vertical play of the latter therein.

Suitably pivoted or otherwise connected with the sides of the secondary pistons, and parallel with the axes thereof, are trigger-levers T $T^{\times}$, substantially of the form shown, while to the upper extremities of said secondary pistons are hinged the lower arms, V $V^{\times}$, of lock-operating cranks U $U^{\times}$, pivoted on the under side of

the cross of the switch-lever, the upper arms, W W$^{\times}$, of which are entered within slots X X$^{\times}$ in a slide-bar, Y, suitably supported against the face of the base or cross of a T-shaped switch-lever, Z, the upright arm of which is suitably hung to the shifter-bar Z$^{\times}$ of the switch-rails. The form of the slide-bar Y is represented in top-plan view in Fig. 5, which exhibits a doubly-inclined stud, *c*, projected from the inner side of a bend in the bar, the office of which stud is to cause the tripping of a lock-lever, *d*, pivoted upon the outer face of the upright arm of the T-shaped switch-lever Z, as the slide-bar is thrown from side to side in the operation of the switch. The lock-lever is bent to a right angle at its upper extremity, the bent portion or hook registering with one or the other of two holes, *e e*$^{\times}$, in a cross-strap, *f*, (suitably secured and bridging the lever Z,) according as the throw of the lever is to the right or left.

g is a fixed trip-bar spanning the line of thrust of the secondary pistons, the office of which is to trip the upper extremity of one or the other of the triggers T T$^{\times}$ of said secondary pistons, and thereby cause the release of the lower end of said trigger from its rest upon the head ledge *h* of the primary piston, and thereby permit the drop of the secondary piston within the primary piston to the extent which their telescopic relation enables.

i is an arc-shaped socket-bar provided with two sockets, *j j*$^{\times}$, into one or the other of which a correspondingly-shaped stop-bar, *k*, enters at either end of the throw of the switch-lever.

The stop bar and sockets may, if desired, be made of lead or other soft metal, and their conjoint action in the throw of the switch-lever is that of an air-cushion to obviate shock or damage to the operative mechanism of the switch.

Such being the construction of my device its operation is as follows: Suppose the parts to be in the position represented in Fig. 2, and a train approaching the siding upon which it is desired to switch it off, the cylinder or other device carried beneath the engine encounters the pump-depressor D F, and forces the ball-plunger into the spherical pump with the result that a violent current of air or fluid is expelled therefrom through the line K and into both the cylindrical bellows. As soon as the train has passed over the depressor, the spring G of the latter causes its return to its former position, the raising of the ball-plunger, the subsequent relief of pressure upon the bellows, and the reflux of the air or fluid into the pump. During the moment, however, in which the pressure was supplied to the pair of bellows (the parts being in the position shown in Fig. 2) its action was to expand the left-hand bellows, P, (the right-hand bellows, P$^{\times}$, being already expanded to its full extent,) to thereby raise its primary piston R, and with it the secondary piston S, which, for the time being, was in a continuous piece therewith, by reason of the resting of its trigger T upon the head ledge *h* of said primary piston R, to thereby, in turn, tilt the lock-operating crank U until its upper arm, W, was thrown to the left, (thereby moving the slide-bar Y to the left, and, by the action of the stud *c*, causing the release of the lock-lever *d* from its lock-hole *e*,) and until its lower arm, V, encountered the under surface of the cross of the switch-lever and caused the movement of the latter from the left to the right and the consequent shifting of the switch-rails to the side track. At the moment of the completion of the above action the trigger T will have been tripped by the trip-bar *g*, under which, in its upward movement, it had been thrust, the lock-lever will have been locked in the lock-hole *e*$^{\times}$, so as to lock the rails in their shifted position, and the lock-operating crank U$^{\times}$ will have been reversed, so as to throw down the secondary piston S$^{\times}$, and thereby cause the dropping of the primary piston R$^{\times}$ until the trigger T$^{\times}$ engages with its head ledge *h*$^{\times}$ and completes the reversal of the parts. In the above action the throw of the switch-lever from left to right is cushioned by the throw of the socket-bar into the air-socket *j*$^{\times}$.

It will be understood that after the above throw the right-hand bellows, P$^{\times}$, is compressed by the drop of its primary piston R$^{\times}$ thereon, and that by such drop (which is due to gravity) the trigger T$^{\times}$ is set so as to cause the temporary union in a continuous piece of both primary and secondary pistons of said bellows P$^{\times}$, and thereby such parts are left in position to be acted upon by the next impulse of air or fluid, the primary piston R of the other or left-hand bellows, P, remaining at the top of its casing, and depending from the head of the secondary piston, which, in turn, is suspended in its uppermost position by the position of the switch-lever in such relation of parts. A second impulse from the pump will cause an opposite action of parts, an opposite throw of the switch-lever, and a return of the switch-rails. At the end of each throw the switch-rails are locked by the lock-lever *d*, and the parts left in suitable position for reversal upon the next action of the pump.

It is obvious that the device may be made double-acting, the depressor-plate being double-faced, and made to be operated upon by a train approaching in either direction; while it is also obvious that two sets of depressors and pumps on opposite sides of the switch may be employed in connection with one switch-lever and one pair of bellows.

I do not confine myself to the precise forms of minor mechanical devices which I employ in combination to effect my result, as I contemplate resorting to many allied mechanical devices for the carrying out of the minor features of my invention.

It will also be understood that the pump H, instead of being made spherical, in the manner shown, and instead of being supported in a hemispherical holder, may be of other suitable form and supported in a holder of corresponding form.

It is also evident that the mechanism herein

described may be connected direct with a hand-lever located on the road or in a cabin, and be operated thereby, instead of by the action of a passing train.

It is likewise evident that the stop-bar and sockets may be applied either to the shifter-bar or points of the switch-rails, instead of being applied to the switch-lever.

Having thus described my invention, I claim—

1. In combination with a pair of cylindrical bellows and pistons which are loosely fitted within suitable casings and connected by suitable means with the switch-rails of a switch, an air or fluid pump adapted to be operated upon so as to cause the expulsion of air or fluid into said incased bellows for the operation of the switch, substantially as described.

2. The switch-lever Z, in combination with a pair of cylindrical bellows operated by air or fluid, as described, by means of primary pistons, secondary pistons, and lock-operating cranks, substantially in the manner shown and described.

3. In combination with an air or fluid bellows, a primary piston superimposed thereupon, a secondary piston telescopically arranged within the primary piston, and a trigger affixed to the secondary piston, which both permits of the downward telescoping of the pistons and enables their conjoint upward movement, substantially as and for the purpose specified.

4. In combination with the switch-lever Z, the lock-lever *d*, and the slide-bar Y, substantially as and for the purposes set forth.

5. In combination with the secondary pistons S $S^{\times}$ by means of the cranks U $U^{\times}$, the slide-bar Y, operated as described.

6. The switch-lever Z, provided with a stop-bar, *k*, in combination with an air-cushion socket-bar, *i*, as set forth.

7. An air or fluid pump of rubber or kindred material, provided with holes for the ingress and egress of air, in combination with a holder, casing, or jacket, of metal or other hard material, adapted to retain the same in place, and to prevent its rupture under the action of its operating-plunger, substantially as described.

8. As a device for operating the plunger of an air or fluid pump, and in combination with the plunger-rod M thereof, the lever-arm F, located below the road-bed, and provided with the depressor-plate D, projecting above said bed, substantially as described.

9. The combination of a primary piston, a secondary piston, and connecting mechanism herein described, to form a compound piston adapted to operate rigidly in one direction and telescopically in the other, substantially as described.

R. P. GARSED.

Witnesses:
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MARY GARSED.