No. 846,764. PATENTED MAR. 12, 1907.

W. R. THOMPSON.

SWITCH.

APPLICATION FILED APR. 21, 1906.

Fig. 2.

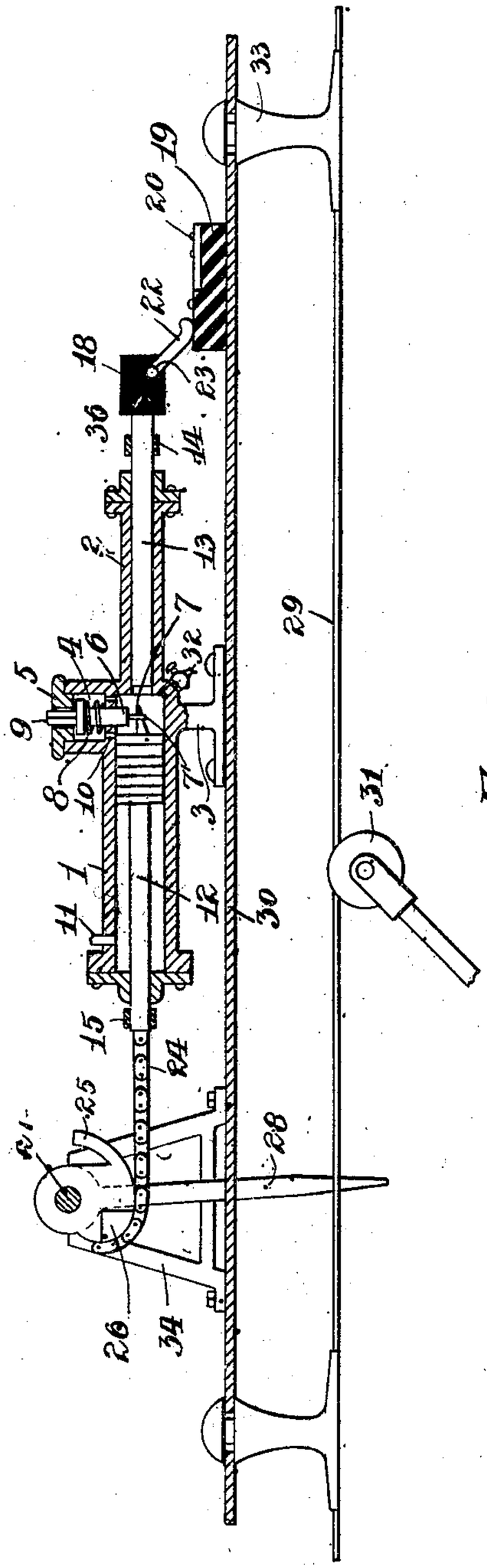
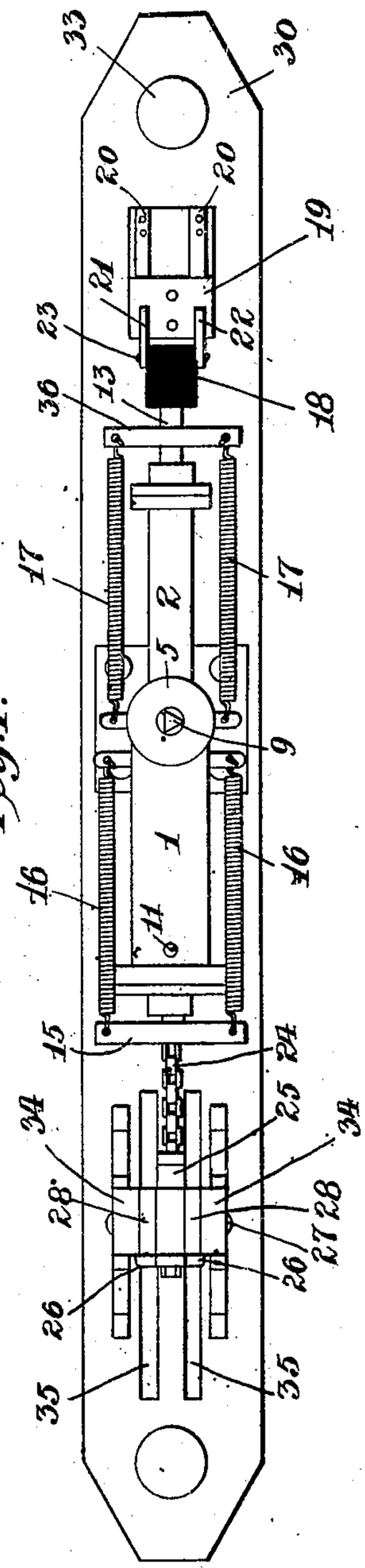


Fig. 1.



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UNITED STATES PATENT OFFICE.

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SWITCH.

No. 846,764. Specification of Letters Patent. Patented March 12, 1907.

Application filed April 21, 1906. Serial No. 312,952.

To all whom it may concern:

Be it known that I, WILLIAM R. THOMPSON, a citizen of the United States, residing at South Norwalk, Connecticut, have invented certain new and useful Improvements in Switches, of which the following is a clear, full, and exact description.

The object of this invention is to provide a novel mechanism for operating a switch from an operating device, preferably a lever or arm which is to be moved, as by part of a car striking it, so that the actuating of the lever and the holding of it in actuated position will not close the switch, and thus send a signal, but that the switch will be closed and the signal will be sent when said lever is freed, and, further, to enable a definite length of time to elapse independent of the speed of the car between the making and breaking of the switch-contact.

In electrically operating signals by means of electrical contact-strips electrically controlled or by means of a switch mechanically controlled by a moving part of a car, such as the trolley-wheel, great trouble is encountered in securing an actuated device which will have a substantially uniform time of contact for operation of the signals independent of the speed of the car. If the contact is short, a rapidly-moving car will hardly affect the mechanism. If the contact is long, there is great danger of a car standing on the contact and keeping the signal operated. There is also found great trouble in preventing operation by a car moving in the opposite direction, which may sometimes be a car backing on its own track. It is to obviate these difficulties that I have devised the mechanism of this invention, which accomplishes all these desired purposes in the device herein shown through the aid of a fluid-pressure apparatus; but obviously it is not essential that the device be fluid-operated. I prefer to secure this result by a mechanical fluid-operated device consisting, preferably, of a pneumatic transmitting device between the operating-arm and switch. This preferred device resembles closely the ordinary pneumatic gun, in which the projectile has its place taken by a switch-arm or plunger which is preferably so designed as never to leave its cylinder.

The operating-plunger of the device, like the pneumatic gun, is preferably held inward in its cylinder by strong springs, while a chain secured to the plunger and to the operating-lever serves to draw the plunger out. I prefer that the chamber for the plunger be of greater volume and diameter than the chamber for the switch rod or plunger, so that a short slow motion of the plunger will rapidly throw the rod out into engagement and keep it there for an appreciable moment. I prefer to provide a restricted throttle-outlet to the cylinder to determine the length of such contact, governing the time of motion like a dash-pot. I also provide an automatic let-off valve for operation toward and preferably at the end of the stroke of the plunger for opening the intercommunicating cylinders to the outer air, so as to allow certain springs to rapidly retract the small switch-plunger to break the signal-circuit.

I have described this invention in the following description as applied to an overhead switch for trolley-roads and have so shown it in the drawings; but I do not restrict myself to its use in such connection nor in the precise construction shown.

In the accompanying drawings, Figure 1 is a plan of my improved apparatus, and Fig. 2 is a central longitudinal section of the device of Fig. 1.

As shown in the drawings, there is illustrated an overhead switch for a trolley-road for operating a signal-circuit from a switch-block of insulation 19, upon which two terminal contacts 20 are secured in a stepped recess of the block. The block is mounted on a base-plate 30, held on suitable insulators 33, attached to the trolley-wire 29. To the other end of the base-plate 30 there are secured two brackets 34, one on each side of slots 35 in the base-plate. The brackets carry the shaft 27 with depending tripping-arms 28, freely pivoted thereto and hanging slightly below the trolley-wire 29, so that the trolley-wheel 31 will strike the lower end of the depending arms or levers 28 to throw them to one side or the other as the car passes beneath. There is loosely mounted on the shaft 27 a segment 25, to which one end of an operating-chain 24 is attached. The segment 25 has two projecting lugs 26, extending at right angles to the base-plate

and occupying a position over the slots 35 in the same, so that the trolley-pole when moving in the direction shown in the drawings will strike the arms 28, cause them to abut against the lugs 26 to rotate the segment, and exert tension on the chain 24. Midway between the contact-block 19 and the operating switch-lever and brackets I mount a pneumatic transmitting means comprising a large cylinder 1, communicating with a small cylinder 2, both mounted upon a bracket 3. The large cylinder is provided with a piston-rod 12 for its plunger, which is secured to the chain 24, while the other end of its plunger carries a wedged tripping device 7. An outlet 11 is made at one end of the chamber, while an outlet-regulating valve 32 is arranged to communicate with the mid-portion of the chamber. Springs 16 16, secured to a cross-head 15 on the piston-rod 12, serve to normally force the piston or plunger into the position shown in Fig. 2. The cylinder 2 is provided with a plunger-rod 13, carrying an insulated contact-block 18 at its free end, which may have suitable contact-levers 21, mounted on a shaft 23, passing through the block, so that upon the passage of the block over the contact-strips 20 the circuit will be closed to any desired electrical apparatus. A cross-head 36, fast to the plunger-rod 13, is connected by springs 17 to suitable lugs on the outside of the cylinder-casing. The springs 17 are of less strength than the springs 16. On a vertical line with the inner position of the wedged tripping device 7 I provide a chamber 4, having openings 10 to the cylinder 1 and having an outlet to the atmosphere. In this chamber I provide a let-off valve comprising a stem 6, a valve-body 5 pressed against the opening to the atmosphere by a spring 8 when the plunger is retracted. The valve preferably has a three-cornered stem passing through the outlet to the atmosphere to make a free passage to the air. The lower end of the valve within the cylinder carries a loop 7′ in such position with relation to the tripping-wedge that the valve may be engaged and held off its seat when the device is in the position of Fig. 2.

In operation when the trolley-wheel 31 strikes the depending arms 28 it throws the segment 25 to the left of Fig. 2 to pull the plunger 12 out against the action of the springs 16, and when the wheel leaves the arms 28 the springs will tend to return the piston, compressing the air within the cylinder 2 and throwing the contact-block 18 to the right to make contact. The piston 12 will travel inward slowly in comparison to the movement of the contact-piston, because of its larger diameter. Its time of travel will be regulated by the throttle-valve 32, so that a dash-pot action will be secured during the inward travel of the piston during substantially the entire inward travel of which the contact-block will be in connection with the strips. When the plunger reaches the position shown in Fig. 2, its wedge will engage the loop 7′, draw the valve 5 downward against its spring and open the two cylinders to the atmosphere, allowing the piston 13 to rapidly be drawn back to the position shown by the spring 17, in which position the device will be ready for another operation. These springs 17 may act to limit the outer movement of the piston 13, though other means may obviously be used.

It will be noted that a trolley-wheel traveling in the opposite direction on the wire 29 will have no effect upon the arms 28, except to idly oscillate them, and that a car standing in position with its wheel against the levers 28 will be able to send no signal until the levers are released by the wheel in view of the loose chain 24.

What I claim as my invention is—

1. A switch, an operating device therefor, a spring-operated fluid-transmitting device between them, an automatic let-off valve and means adapted to operatively connect the same and the transmitting device, after the operation of the switch-arm by the transmitting device.

2. A switch, an operating-arm therefor, a spring-operated fluid-transmitting device between them, said device comprising a plunger connected to said arm, and a cylinder in which it may be reciprocated to be withdrawn by said arm, and spring means to retract said plunger upon its release, an automatic let-off valve adapted to be engaged by said plunger toward the end of its stroke.

3. A switch, an operating-arm therefor, a spring-operated fluid-transmitting device between them, said device comprising a plunger connected to said arm, and a cylinder in which it may be reciprocated, said switch comprising a plunger, a cylinder therefor operatively connected with said first cylinder, an automatic let-off valve adapted for operation after the transmitting of the motion of the operating-arm to the switch-arm.

4. A switch, an operating-arm therefor, a spring-operated fluid-transmitting device between them, said device comprising a plunger connected to said arm, and a cylinder in which it may be reciprocated, an automatic let-off valve adapted to be engaged by said plunger toward the end of its stroke.

5. In combination with a conductor, an insulated support therefor, a structure carried on said support comprising two chambers intercommunicating with each other, a vent to the interior of said chambers, a piston in one chamber, a contact-block carried thereby, a second contact-block carried on said support, and adapted to be operatively

engaged and disengaged by the contact-block of the plunger, a piston in the other chamber, an operating-arm freely pivoted on said support and engaged by a flexible connection with said second piston, said operating-arm extending into the path of travel of the wheel of a vehicle.

Signed at New York, N. Y., this 19th day of April, 1906.

WILLIAM R. THOMPSON.

Witnesses:
EMERSON R. NEWELL,
BEATRICE MIRVIS.