(No Model.)

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CIRCUIT CLOSER FOR RAILROAD CROSSING SIGNAL MECHANISMS.

No. 483,231. Patented Sept. 27, 1892.

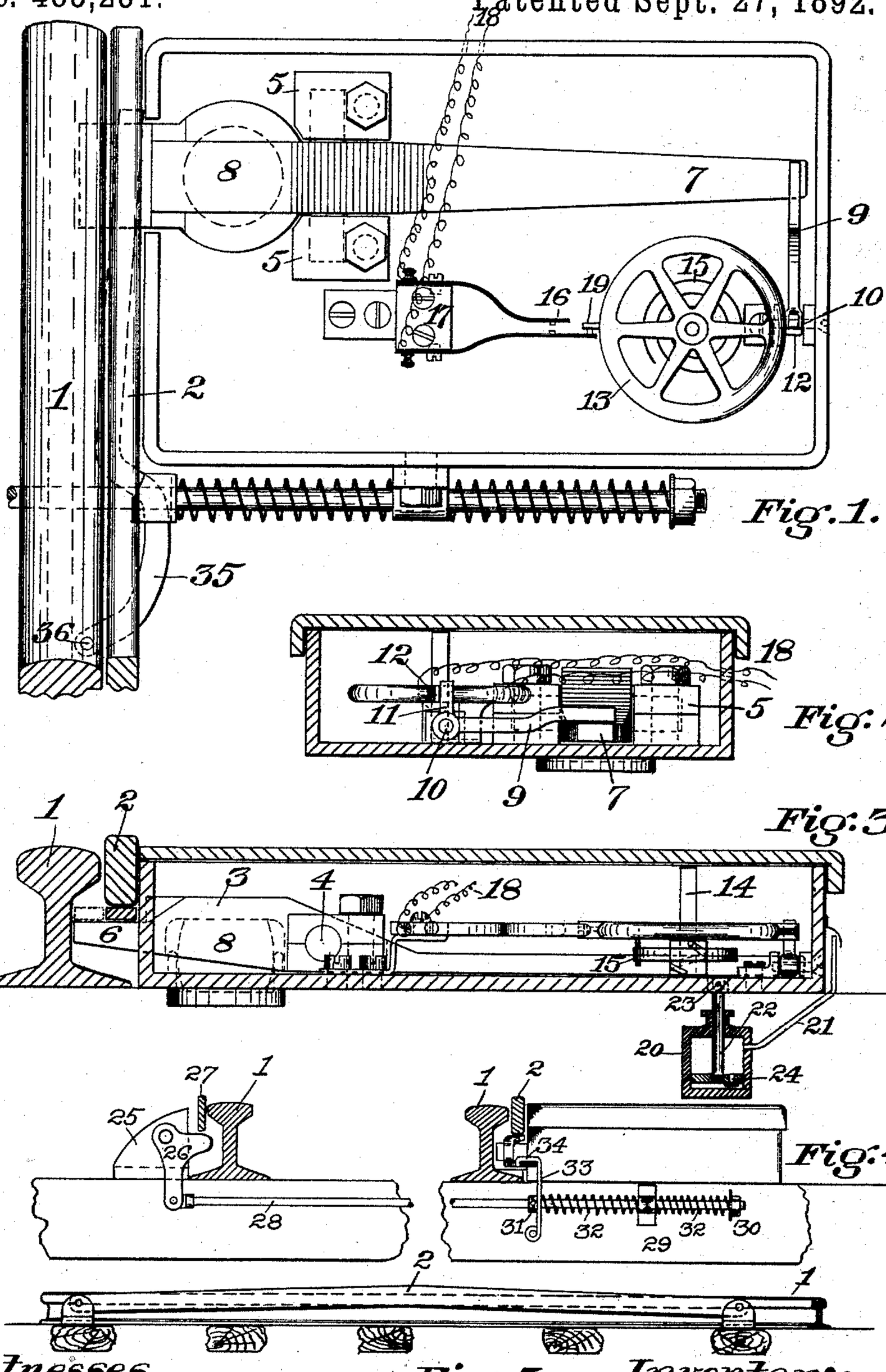

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses

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CIRCUIT-CLOSER FOR RAILROAD-CROSSING SIGNAL MECHANISMS.

SPECIFICATION forming part of Letters Patent No. 483,231, dated September 27, 1892.

Application filed November 6, 1891. Serial No. 411,037. (No model.)

To all whom it may concern:

Be it known that we, IRVIN W. LOY and RICHARD O'TOOLE, citizens of the United States, and residents of Mechanicstown, in the county of Frederick and State of Maryland, have invented certain new and useful Improvements in Circuit-Closers for a Railroad-Crossing Signal Mechanism, of which the following is a specification.

Our invention relates to a circuit-closer for a railroad-crossing signal mechanism, the object of which is to close an electric circuit for the purpose of giving a signal on the approach of a train to a road or railroad crossing automatically.

In the drawings, Figure 1 is a plan of our circuit-closer mechanism. Fig. 2 is a rear elevation of the same with the end of the box in which the device is inclosed removed. Fig. 3 is a side elevation of the circuit-closer with the side of the box removed and the rail and track-bar in section and also an air-cylinder located below the box in section. Fig. 4 is a side elevation of the structure by which the circuit-closer is made inoperative, the rails and track-bars being in section. Fig. 5 is a side elevation of our track-bar.

In the drawings, 1 is a track of a railroad.

2 is a track-bar consisting of a long steel bar (shown in side elevation in Fig. 5) and securely bolted to chairs at either end. It is of bow form, the extremities being located below the level of the track, while the center rises above the level of the track. We prefer to make this bar of such a shape that a straight line drawn between the centers of support at its ends will lie wholly within the bar. This construction permits the depression of the center of the bar without its elongation. The bar is merely pressed down and rises again, due to its own elasticity. The bar may also be made so that a straight line drawn between the centers of support will not lie wholly within the bar, but will be below it. In this case the extremities are extended when the bar is depressed; but this extension is taken up by the yielding of all of the apparatus with which the bar is connected.

We have found in practice that the constant pounding of a train upon a track-bar will destroy almost any structure which is allowed any kind of play. Even the bars constructed like ours with a slot in one end to permit the extension of the bar wear out with great rapidity in consequence of the friction and rack upon the bolt through the slot. We have therefore found it essential to bolt our bar rigidly to its supports and rely entirely upon its own elasticity for the "give" necessary for its depression.

3 is a lever pivoted upon the shaft 4, held in journals 5 5. One end of this lever 6 extends forward toward the track below the track-bar 2, while the other end 7 extends upward to operate the circuit-closer.

8 is a cushion of either rubber or other form of spring located below the end 6 of the lever 3, so as to maintain that end constantly at its highest point of elevation.

9 is a bell-crank lever pivoted at 10, one end 9 of which rests upon the end 7 of the lever 3, while the other end 11 is vertical and stands in the path of a lug on the side of a balance fly-wheel.

13 is a fly-wheel journaled upon the stud-pin 14.

15 is a light coil-spring arranged like the hair-spring of a watch, one end of which is secured to a stud 14 and the other end to a spoke of a fly-wheel 13. The operation of this spring is to keep the lug 12 in contact with the vertical end 11 of the bell-crank lever and the lug 19 in contact with the extending end of the contact-points. The spring 15 is merely a device for accomplishing the result just stated. The same thing might be accomplished by a spiral slot in a sleeve around the shaft 14 and a pin in the hub of the wheel 13, so that when the wheel was revolved forward the pin would climb up the slot and the wheel would then return to its former position by gravity.

16 is a pair of electrical contact-points, which are secured to an insulated block 17 by binding-posts, to which are also secured the wires of an electric circuit 18.

19 is a pin on the side of the fly-wheel 13 opposite the pin 12. One of the electrical contact-points 16 is longer than the other and extends into the path of the pin 19. The contacts 16 when the pin 19 presses upon the extended one are normally separated and the circuit broken.

20 is a cylinder located below the end 7 of

the lever 3 and provided with an escape-tube 21 from its upper part, which rises beside the box and is covered by any suitable device, so as to exclude dust. Within the cylinder 20 is a piston and rod 22, which reciprocates therein. The upper end of the piston-rod is secured at 23 to the under side of the lever 3 and is operated by it. The piston 22 is provided with a valve 24, so constructed that it will admit air to the space below the piston very rapidly when ascending, but permit the air to escape very slowly when descending. It will be seen that when the track-bar 2 depresses the lever 3 the end 7 will be thrown up and the piston 22 raised. The valve 24 will admit air freely below the piston. As soon as the pressure is removed from the end 6 of the lever 3 the spring 8 will press that end up and the opposite end down. The air contained in the cylinder 20 below the piston will hold the end 7 of the lever 3 up and only permit it to descend very slowly as it escapes. The object of this device is to make the lever 3 inoperative upon the circuit-closing mechanism while the successive wheels of a train are passed over it. The first depression of the track-bar 2 will throw down the end 6 of the lever 3 and the end 7 up, operate the mechanism, and close the circuit; but the air caught in the cylinder 20 will prop the end 7 up and maintain it so and the end 6 down until the train has passed, when the gradual escape of the air from below the cylinder will allow the lever 3 to assume its former position. It will thus be seen that this structure will prevent the successive wheels of the train from operating the circuit-closer and relieve that apparatus of all the wear due to its unnecessary operation after the first signal has been given.

This is the form of structure used for a double-track railroad and operates as follows: The bar 2 depresses the end 6 of lever 3 and raises the end 7 and throws up the lever 9 and actuates the vertical end 11 of the bell-crank lever, which strikes the pin 12 and revolves the fly-wheel. This carries the pin 19 away from the extending end of the contact-points 16 and permits them to come together and close the circuit, and the signal at the crossing is operated by its local battery.

When the structure is to be employed upon a single-track road, it is necessary to arrange the circuit-closer in such a manner as to operate and give a signal of the approach of a train to the crossing, but to be inoperative when the train is leaving the crossing. This we accomplish by the mechanism in Figs. 1, 3, and 4.

Referring to Fig. 4, 25 is a chair bolted on a cross-tie beside the rail on the opposite side from the circuit-closer, to which is pivoted a bell-crank lever 26, one of the arms of which stands horizontally toward the track, the other arm of which is vertical. 27 is a track-bar made in the same form as the track-bar 2, but much lighter. It stands opposite the track at a point nearer the crossing than the track-bar 2, or it is made of greater length than the track-bar 2, so that it will be struck by the wheels of a train moving away from the crossing before the wheel strikes the track-bar 2. 28 is a rod connected at one end of the vertical extremity of the bell-crank lever 26. It passes below the track and the other end passes through a keeper 29, which is secured to the side of a cross-tie below the circuit-closing box. 30 and 31 are two nuts secured upon the bar 28, one at its extremity and the other near the track. Between these nuts and the keeper 29 are two spiral springs 32 32, which maintain said rod in a constant position. 33 is a plate of metal through which the rod 28 passes and which is secured to it in front of the nut 31. It rises above the tie and upon its end is provided with a hoop 34. 35 is a lever pivoted to the flange of the rail at one end of its extremity 36 and extends backward toward the lever 3, and its other end crosses said lever and lies between it and the track-bar 2. The lever 35 is of such thickness that it will pass between the track-bar 2 and the extremity 6 of lever 3 when they are both in their normal position. It will be seen that the distance between the bottom of the track-bar 2 and the inside of the center portion of the rail is a little more than equal to the bar 35, so that said bar may be pushed from under the track-bar lever 2 over against the rail, and the track-bar descending will not strike it. The track-bar 2 is arranged so as to stand above the rail a distance just equal to the distance of lever 35. When, therefore, it is removed from below the track-bar and the track-bar depressed, it will not strike the end 6 of lever 3, and therefore will not operate the circuit-closer.

The operation of the device is as follows: When a train approaches a crossing on a double-track road, bar 2 is depressed, and the lever 35 being below it the lever 3 will be depressed and the bell-crank levers 9, 10, and 11 will be operated, fly-wheel 13 relieved, and the contacts 16 will come together and the circuit be closed and the signal given. The depression of lever 3 by the first wheel and the engine will draw the piston 22 and cylinder 20 up and prop the end 7 of the lever 3 up, so as to prevent the track-bar 2 from striking the end 6. If the road be a single one, the first pair of wheels after passing the track-bar 2 will depress the track-bar 27 and by doing so will operate the bell-crank lever 26 and rod 28 and push the lever 35 out from under the track-bar 32. This will be continued as the wheels pass over the track-bar 27, and the circuit-closer cannot be operated when the track-bar 27 is depressed. This same thing applies when the train is leaving the crossing on a single-track road. The track-bar 27, being much longer than the track-bar 2, will be struck by one wheel of each pair before the track-bar 2 is struck by the other one. Hence while the track-bar 27 is de-

pressed the circuit closer cannot be operated and no signal will be given when the train is leaving the crossing.

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

1. The combination of a track-bar located by the side of a railroad-track with a lever pivoted near the same, one end of which protrudes beneath the track-bar and the other end of which operates a spring-controlled fly-wheel, and a pair of contact-points which are the terminals of an electric circuit containing a bell and which are maintained out of contact with one another by the fly-wheel when it is at rest under the influence of its spring.

2. In a circuit-closing device for a railroad-crossing signal, the combination of a track-bar secured to suitable supports parallel to the track and standing above it in position to be depressed by a passing train with a lever pivoted near the track, one end of which extends below the track-bar in position to be struck by said bar when it is depressed, the other end of which operates a bell-crank lever pivoted in position to operate, a spring-controlled fly-wheel, a fly-wheel mounted upon a suitable shaft and retained in a desired position by a spiral spring, one end of which is secured to the shaft and the other end to the wheel and which is provided with means by which it is caused to revolve by the operation of the bell-crank lever, and a pair of electric contact-points which form the terminals of an electric circuit in which there is a signaling apparatus, said fly-wheels striking one of said terminals and operating under the influence of its spring to prevent its contact with the other terminal, substantially as described.

3. In a circuit-closing device for a railroad-signal apparatus, the combination of a track-bar, located beside the track, having a portion of its surface slightly above the track in position to be depressed by a passing train, a circuit-closing mechanism included in an electric circuit and closed by mechanism operated by the track-bar, a second track-bar on the opposite side of the track, located in position nearer to the crossing than the other one, so that it will be depressed before the other one by a train leaving the crossing, and a bell-crank lever operated by the second track-bar, to which is connected a rod, said rod passing below the track and connected to a third lever, which is suitably pivoted by the side of the track and normally stands below the first track-bar, but which is withdrawn from below said track-bar when the second track-bar is operated.

Signed at Baltimore city and State of Maryland this 4th day of November, A. D. 1891.

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Witnesses:
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