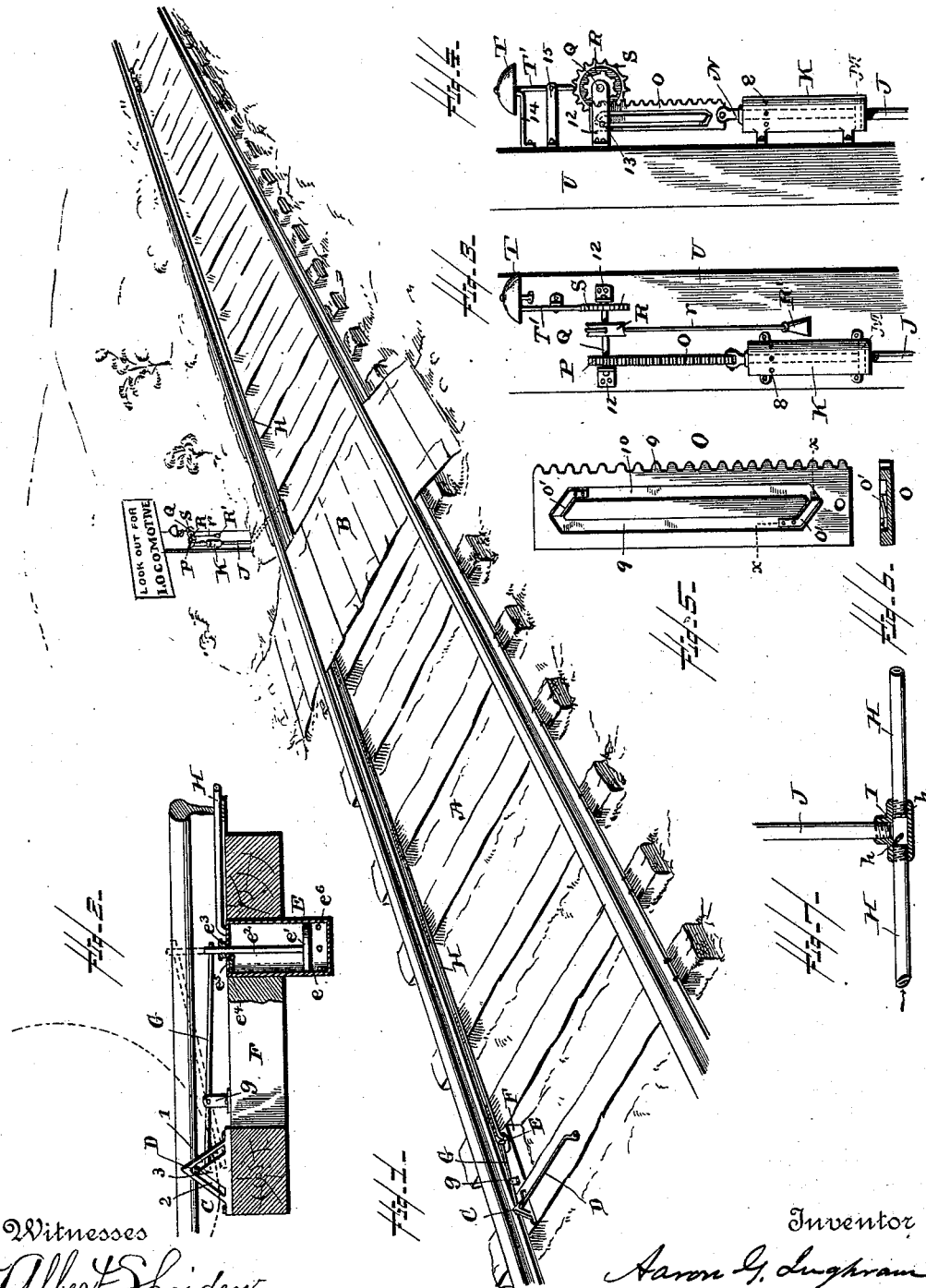


(No Model.)

A. G. INGRAM.
PNEUMATIC RAILWAY SIGNAL.

No. 423,477.

Patented Mar. 18, 1890.



Witnesses
Albert Speiden,
B. R. Werden,

Inventor
Aaron G. Ingram
 By his Attorney
Wm Hunter Meyer,

UNITED STATES PATENT OFFICE.

AARON G. INGRAM, OF OMAHA, NEBRASKA.

PNEUMATIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 423,477, dated March 18, 1890.

Application filed January 2, 1890; Serial No. 335,567. (No model.)

To all whom it may concern:

Be it known that I, AARON G. INGRAM, a citizen of the United States of America, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Pneumatic Railway-Signals, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in pneumatic signals for railways, and it has for its object the production of a simple and effective signaling apparatus, which will operate to sound an alarm only as the train of cars approaches a crossing.

The invention will first be described in connection with the accompanying drawings, and then pointed-out in the claims.

Figure 1 of the drawings is a perspective view of a railway-track on which my signaling apparatus is placed at a crossing. Fig. 2 is a sectional detail view showing the air-pump and its actuating mechanism. Fig. 3 is a front elevation of the alarm-sounding mechanism. Fig. 4 is a side elevation of the same. Fig. 5 is a detail side elevation of the rack-bar enlarged. Fig. 6 is a transverse section of the same, taken on the line $x x$, Fig. 5. Fig. 7 is a broken detail view, partly sectional, illustrating the manner of connecting the air-tubes with the cylinder secured to the sign-post.

Referring to the drawings, A represents a railway, and B a crossing.

C represents what I term a "spring-guide," which consists of a plate of metal, preferably of triangular shape, as shown. In the sides of this plate there are slots 1 and 2, which incline toward each other from the base upward until they meet at the top, leaving a triangular wall 3 between them. This plate is bolted to one of the cross-ties, a short distance inside of one of the railroad-rails and parallel with it.

D is a rod of spring metal, one end of which is secured in the cross-tie, its free end passing through the spring-guide C a short distance, that portion of the spring which is within the guide resting normally over the apex of the wall 3.

E represents an air-pump of ordinary construction, consisting of a cylinder e , closed at top and bottom, a piston e' within the cylinder, and a piston-rod e^2 , connected to the pis-

ton and passing through a gasket e^3 in the top of the cylinder. An upwardly-closing valve e^4 closes an air-inlet e^5 in the top of the cylinder, and openings e^6 , beneath the piston when in its lowest position, permit the escape of air. The air-pump is placed in the road-bed near to the rail and against one of the cross-ties, and is held in position by means of a block of wood F, cored out at one end to encircle the pump, and fitted tightly between two cross-ties, as clearly seen in Fig. 1.

G is a lever fulcrumed in a bracket g , secured to block F, one end of the lever passing through the slotted upper end of the piston-rod and the other end reaching just to and lying beneath the projecting end of spring D when the latter is in its normal position.

H is an air-tube leading from the air-pump to the place where the signal is located at the crossing, it being understood that the air-pump is to be located about one hundred and fifty or two hundred yards from the crossing, and that there is to be an air-pump and actuating mechanism on each side of the crossing. One end of the tube is tightly fitted in the top of the pump-cylinder, and its other end, which is provided with a flap-valve h , is screwed into a metal T I, from which another tube J extends to and enters the bottom of a cylinder K, secured in a vertical position to the sign-post U.

In the cylinder K there is a piston M, whose rod N is pivoted to the lower end of a rack-bar O, which is provided with gear-teeth o on its front edge, and in one side of this rack-bar there is a continuous groove, which, for convenience of description, I designate by the Figs. 9 and 10. In the turn of this groove at each end there is secured a flat spring o' , (see Figs. 4 and 5,) whose free end stands flush with the outer surface of the groove, as seen in Fig. 6. The rack-bar O gears with a small gear-wheel P, mounted upon a shaft Q, journaled in brackets 12, secured to post U, a pin 13, projecting from the bracket nearest this wheel, entering the groove in the rack-bar, for a purpose which will appear farther on. On shaft Q there is also mounted a grooved pulley R and a toothed wheel S, to the former of which there is secured a cord r , carrying a weight R'.

T represents a gong-bell supported on an arm 14, secured to post U, and T' is its striking-rod, which is pivoted to a bracket 15, se-

cured to said post, the lower end of this rod being in engagement with the teeth of wheel S, as clearly seen in Figs. 3 and 4.

The operation of my pneumatic railway-signal is as follows: Assuming that a train of cars is approaching the crossing from either side, when the flange of a car-wheel comes into contact with the projecting end of the spring-rod D the latter is borne down the slot 1 in the spring-guide C and onto the end of lever G, tilting it and raising the piston of the air-pump, when the valve e⁴ will be closed and the air forced out through tube H, up into and through tube J, and thence to cylinder K under the piston M, forcing the latter, and consequently the rack-bar O, upward, the air above the piston escaping through perforations 8 in the cylinder. When the rack-bar is down, the pin 13 is in engagement with the rear portion 9 of the groove in said bar, and by this means the rack-bar is held in gear with gear-wheel P. As the rack-bar ascends, shaft Q is turned, winding up the weight-cord, and also sounding the gong by reason of the lower end of its striking-rod riding over teeth of wheel S. As the rack-bar nears its full upward throw, the lower spring o' passes over the pin 13, and then when the bar has reached its highest position it will have been so guided by the pin that the latter will enter the front portion 10 of the groove with the effect of throwing the rack-bar backward out of mesh with wheel P, the spring o' preventing the pin from getting back into the rear portion 9 of the groove at that end of the bar. In moving the rack-bar up to this position the piston M will have passed above the perforations 8 in the cylinder, thereby permitting of the escape of air from beneath it through them. Now, as the rack-bar is out of gear with wheel P, it drops by gravity to its lowest position again, and the shaft Q being free to revolve, the weight R' gradually descends, turning the shaft and ringing the gong. In the fall of the rack-bar the upper spring o' passes over pin 13 and the bar is thrown again into mesh with wheel P, the pin being now once more in the rear portion 9 of the groove, ready for the next operation. The alarm is not sounded as the train leaves the crossing, for the reason that the wheel-flange carries the projecting end of the spring-rod D down the slot 2 in the spring-guide C, and as it moves down the inclined wall 3 it is carried clear of the end of the lever G, as will clearly appear on an inspection of Fig. 2.

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

1. In a pneumatic railway-signal, the combination, with an air-pump, of the spring-guide having two inclined slots, which come together at their top ends, the spring-rod, secured at one end to a suitable support in the road-bed, its free end passing through the spring-guide at the apex of said slots,

and a lever, one end of which is connected with the piston-rod of the air-pump, its other end being located beneath the projecting free end of the spring-rod, all arranged substantially as described and for the purposes set forth.

2. In a pneumatic railway-signal, the combination, with a cylinder provided with a piston and a piston-rod secured to a post, and mechanism operated by a passing train of cars for forcing air into the cylinder under its piston, of a shaft journaled in bearings on said post and carrying a gear-wheel and a pulley, a weight attached to a cord secured to the pulley, a bell mounted on the post, a rack-bar pivoted to the piston-rod and capable in its reciprocations of being automatically thrown into and out of mesh with said gear-wheel, and means for sounding the bell in the revolutions of the shaft, substantially as described.

3. In a pneumatic railway-signal, the combination, with a cylinder provided with a piston and a piston-rod secured to a post, and mechanism operated by a passing train of cars for forcing air into the cylinder under its piston, of a shaft journaled in bearings on the post and carrying a gear-wheel, a pulley and a toothed wheel, a weight attached to a cord secured to the pulley, a bell mounted on said post, a striking-rod for the bell in engagement with the said toothed wheel, and a rack-bar pivoted to the piston-rod and capable in its reciprocations of being automatically thrown into and out of mesh with said gear-wheel, substantially as described.

4. In a pneumatic railway-signal, the combination, with a cylinder provided with a piston and a piston-rod secured to a post, and a shaft journaled in bearings on said post and carrying a gear-wheel, of a rack-bar having a continuous groove around one of its surfaces and provided with a spring in each turn of the groove, and a fixed pin, which is in engagement with said groove, the rack-bar being pivoted to the piston-rod, whereby said bar in its reciprocations is automatically moved into and out of mesh with said gear-wheel, for the purposes stated.

5. A pneumatic railway-signal comprising air-pump E, spring-guide C, spring-rod D, lever G, cylinder K, provided with a piston and a piston-rod, air-tubes H I J, connecting the pump and cylinder, shaft Q, carrying gear-wheel P, pulley R, provided with weight R', and toothed wheel S, bell T, and its striking-rod T', rack-bar O, and the fixed pin 13, the whole constructed and arranged substantially as described, and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

AARON G. INGHAM.

Witnesses:
E. E. CLIPPINGER,
C. H. PARTRIDGE.