(No Model.) 2 Sheets—Sheet 1.

A. M. AMOS.

AUTOMATIC RAILROAD SIGNAL.

No. 344,024. Patented June 22, 1886.

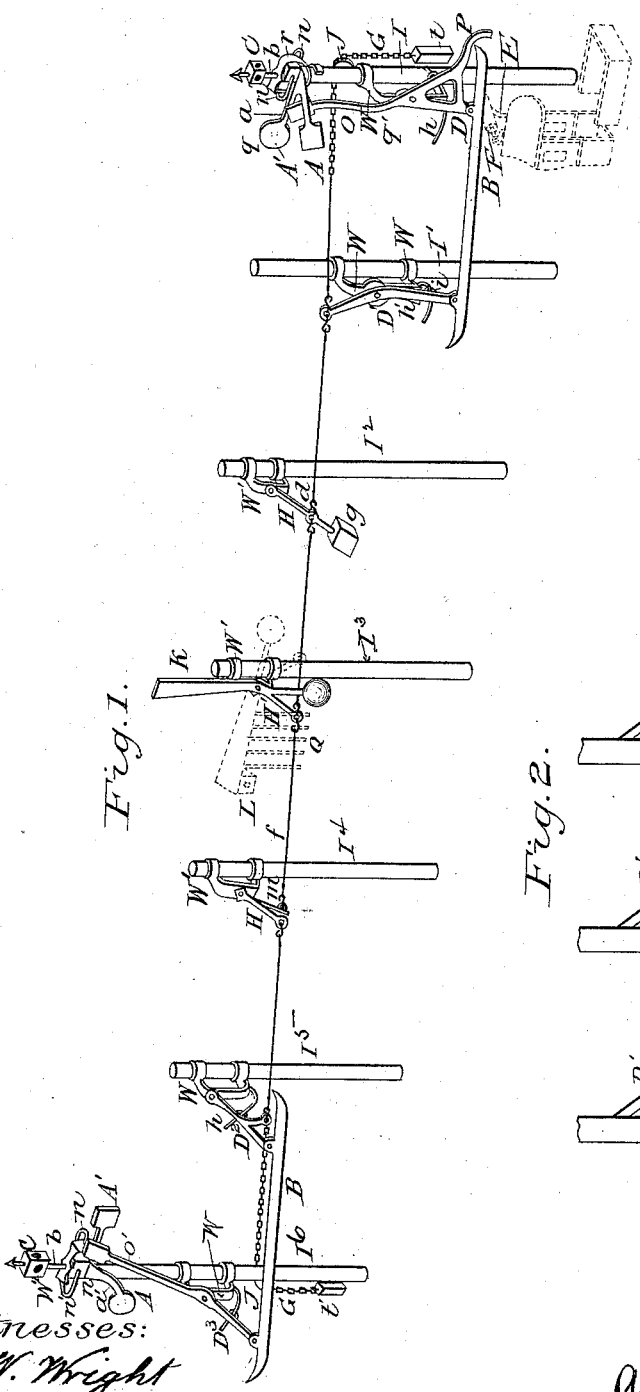

Fig. 1.

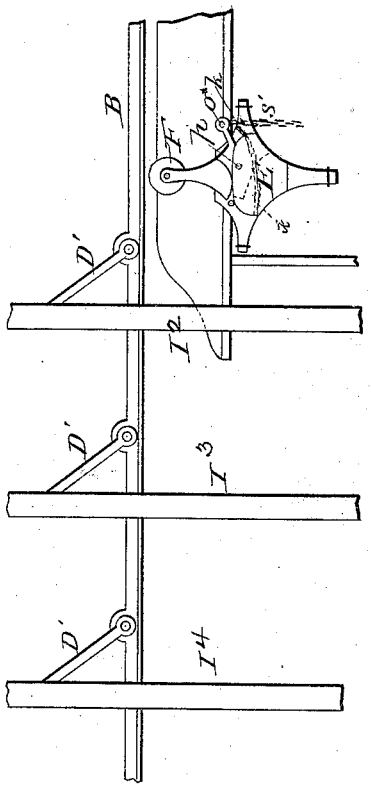

Fig. 2.

Witnesses:
J. W. Wright
Edward S. Chase

Inventor:
Alexander M. Amos

(No Model.) 2 Sheets—Sheet 2.

A. M. AMOS.

AUTOMATIC RAILROAD SIGNAL.

No. 344,024. Patented June 22, 1886.

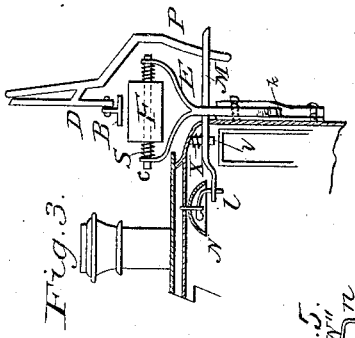

Fig. 3.

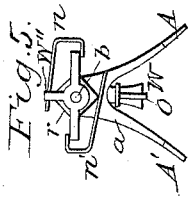

Fig. 5.

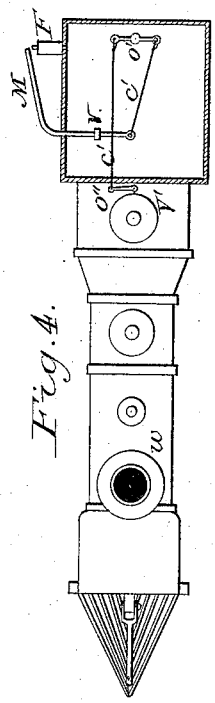

Fig. 4.

Witnesses:
J. W. Wright
Edward S. Chase.

Inventor.
Alexander M. Amos

UNITED STATES PATENT OFFICE.

ALEXANDER M. AMOS, OF BUFFALO, NEW YORK.

AUTOMATIC RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 344,024, dated June 22, 1886.

Application filed March 18, 1884. Serial No. 124,706. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER M. AMOS, of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Automatic Railroad-Signals, of which the following is a specification.

The novelty of my invention consists in operating an automatic signal at each end of a section by means of an adjustable roller on the cab of a locomotive, so as to dispense with any violent or sudden movements of the machinery owing to a high rate of speed.

Semaphore-signals and a signal-lamp are located at each end of a section, at any suitable distance apart, and in entering the section the locomotive sets the signals to indicate "danger," and in leaving the section the signals are returned to their normal condition to indicate "safety."

The accompanying drawings illustrate what I consider the best means for carrying my invention into practice.

Figure 1 is a detailed view in perspective of my improved automatic machinery for operating signals at each end of a section and for displaying a signal at a railroad-crossing. Fig. 2 is an enlarged side elevation of the incline bar, and of the propeller attached to the side of the car or locomotive for operating the same. Fig. 3 is an enlarged rear elevation of the propeller on the side of the cab and of the lever connecting with a gong in the interior and coming in contact with an arm on the exterior. Fig. 4 is a plan view of a locomotive, with the cab in section, showing the propeller-roller and the lever connecting with a steam-whistle on the boiler of the engine by means of a cord; Fig. 5, an enlarged plan view of the lever that operates the signals.

Similar letters refer to similar parts throughout the several views.

In Fig. 1 of the drawings I have shown what is intended to represent one section or block of the signal system, and have shown seven poles or standards, marked, respectively, I I′ I^2 I^3 I^4 I^5 I^6, beginning with the initial and ending with the terminal standard. It will be understood, however, that I may employ any number of standards and make the blocks longer or shorter, as may be desired, and that the standards may be any distance apart.

A forked lever, *a*, having signals A A′, is keyed to a rock-shaft, *b*, which is mounted on the top of the standards I and I^6. These signals may be made any suitable size or shape, one of them to be understood as a danger-signal, and the other as a safety-signal, and they may be keyed to the rock-shaft *b* independently of the lever *a;* but to simplify the machinery they are placed at the terminus of the forked lever, as shown in Fig. 1.

C is a signal-lamp mounted on the rock-shaft *b*, to rotate with the lever *a* and the rock-shaft *b*, having a white face to indicate "safety," and a red face to indicate "danger."

D D′ D^2 D^3 are rocker-arms that are pivoted to bearings W, that are attached to the standards, as shown.

B B′ are T-shaped bars having a broad flat surface underneath. One of these bars is pivoted to the lower end of the rocker-arms D D′, and the other to the lower end of the arms D^2 D^3, and may be made any desired length. The upper part of the arms D D^3 are made of sufficient length to reach the top of the standards I and I^6, and serve as levers O O′, to operate upon the forked levers *a a′*.

E is a propeller which is attached to the cab of a locomotive or to a car or caboose in any suitable way, as shown in Figs. 1, 2, and 3.

F is a roller, which is placed in the center of the shaft *c*, extending across the upper part of the propeller E. Spiral springs S are placed on the shaft *c* on each side of the roller F, to provide against the rocking motion of the cars.

When the locomotive enters the section, the roller F of the propeller E passes under the incline bar B and moves it forward and upward, and the lever O bears against the forked lever *a* in such a manner as to turn the rock-shaft *b* one-quarter, and thus change the signals A, A′, and C to indicate "danger." When the train or locomotive is leaving the section, the incline bar B′ is moved forward, and the lever O and the forked lever *a* are moved backward, and the signals A, A′, and C are again changed to indicate "safety." One end of the connecting-wire *f* is secured to the upper end of the rocker-arm D′, and the other is attached to the lower end of the arm D^2, as shown. The wire *f* is held in position by means of swinging arms H, which are piv-

oted to brackets W′ on the standards. Each arm is provided with a strong hook or link, *d*, to allow ready attachment of the wire.

When the signals are set to indicate "safety" or "danger," the arms H are intended to be in an angular position about one-eighth of a circle from the vertical position of the standards I, and a sufficient number of them have a weight, *g*, at the lower end for the purpose of overcoming the weight of the wire, and thus relieving the propeller E of any unnecessary strain in starting the machinery. When the rocker-arms D′ and D² are set in motion, the arms H and the weight *g* are relieved from their angular position and fall by the force of their own weight, and thus help to start the machinery and to carry the weight of the wire. The arms H may be placed in a horizontal position and assisted in their movements by a spring bearing against a square or friction block in the manner hereinafter more fully described.

For the purpose of maintaining a uniform tension of the wire *f*, weights *t t* are employed. These weights are suspended by chains G, which pass over pulleys J, one chain being attached to the upper end of the rocker-arm D′ and the other to the lower end of the arm D². To give the connection between the arms and wires a slightly-elastic quality, a spring, *m*, may be attached to any number of the rocker-arms H, as shown.

To give notice of approaching trains at a railroad-crossing, a semaphore-signal, K, is pivoted upon the bracket W′ on the standard I³, and is connected with the arm H′, as shown in Fig. 1. When a train enters the section, the arm H′ is moved one-quarter of a circle, and the signal K is changed from a vertical to a horizontal position, indicating the approach of the train. When the train is leaving the section, the arm H′ is brought back one quarter, and the signal is changed to a vertical position, indicating "safety." A lamp, L, is suspended from the end of the signal K to give notice of danger by night, and as an extra precaution to attract attention when trains are approaching the crossing rods Q are suspended from the signal-arm K, as shown.

To hold the bars B and B′ in position so as to be properly operated by the propeller E, guides *h h′* are used. These guides are attached to the lower end of the brackets W, and are made to correspond in shape to the circular movement of the rocker-arms D D′. A steady motion is secured by means of eyelets *i i* on the rocker-arms D D′ operating on the guides *h h′*. The bar B terminates with a curve at each end to provide against any mishap when it is struck by the roller F.

The upper portion of propeller E is pivoted on a center, *p*, as shown, and provided with an arm, O*, and controlling chain or connection *s′*, by which the propeller is tilted. A spring, *k*, (shown in dotted lines in Fig. 2,) is run from the forward end of the upper or pivoted portion down in the seat in the fixed portion of the propeller, as shown in Fig. 3, and will throw the pivoted portion up in the vertical or normal position.

Should it be necessary to pass the signals without operating the machinery, the roller F is moved downward one-quarter of a circle by means of the arm O* and chain or cord *s′*, so that the propeller E will pass under the bar B without moving it. As, however, the propeller may be made rigid, I have shown the jointed form only in Fig. 2, while the rigid form is shown in Fig. 3.

To provide against accident by breaking the wire or other parts of the machinery, owing to a high rate of speed, the incline bar B may be extended to any desired length, and the rocker-arms may be increased to any number, as shown in Fig. 2. By this arrangement the incline being then extremely gradual, the wire *f* can be moved slowly and gradually, so as to dispense with any sudden and jarring movement when operated by trains that are running at the highest rate of speed.

To assist the levers O and O′ in moving the signals A A′ and C and hold them in proper position, springs *n n′* on the bearing W are made to bear against a square or friction block, *r*, on the rock-shaft *b*, as shown in Figs. 1 and 5, so that when the forked lever *a* has been moved a little over the eighth of a circle the springs *n n′* bear against the friction-block *r*, and the signals A A′ and C are forced into proper position without any further aid from the lever O, and to compensate for lost motion in moving the lever *a* the upper end of the lever O is made of sufficient width to fill the space between the forks of the lever *a*, as shown in Fig. 5.

To provide against accident when the danger-signal is displayed at the entrance of a section and the engineer fails to see it, owing to a fog or negligence, or any cause whatever, should he pass the signal and enter the section, I cause an alarm to be sounded in the cab of the engine, so as to give him warning by sound as well as by sight to stop the train until the signal is changed. To attain this object an arm, P, is connected with the rocker-arm D, as shown in Figs. 1 and 3. As the propeller E passes under the bar B, the rocker-arms D and D′ make a circular movement forward and upward, and the arm P partakes of the motion and moves forward and downward and extends below the roller F, but does not come in contact with it, being bent at the lower end, as shown. A lever, M, is made to rotate on a pivot, V, inside the cab of the engine, and is held in position by a spiral spring, X, and, passing through a slit in the side of the cab, is of sufficient length to reach the arm P on the exterior and the hammer *l*, that is pivoted in the center of the gong *h* in the interior, as shown in Fig. 3. When the danger-signal is displayed at the entrance of the section, the arm P is brought down to a vertical position. Should the engineer fail to see the signal and attempt to enter the sec-

tion, the lever M will come in contact with the arm P and will cause the hammer *l* to strike the gong *h* as a signal to stop. To prevent the arm P from being struck too abruptly, owing to the velocity of the locomotive, the lever M terminates with an angle, as shown in Fig. 4.

For the purpose of giving warning of danger to the conductor or brakeman, as well as to the engineer, a cord or rod, *c'*, may be attached to the lever M and connected with a steam-whistle, V', on the boiler *w* by means of levers *o' o''*, or by any suitable device for connecting the lever M with the steam-whistle V', so as to give the alarm when needed. A special whistle may be used for this purpose, giving a peculiar sound that will be always understood. If desirable, the cord *c'* may be connected with a bell or with clock-work.

For the purpose of guarding against accident in case the propeller E should not be properly adjusted, the signals A A' and the signal-lamp C at the entrance of the section may be repeated at the end of the section, so as to be operated by the lever O', in order that the engineer may be able to ascertain before he leaves the section whether the machinery is in good working order, as shown in Fig. 1.

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

1. The device for operating a signal by a passing locomotive, so as to dispense with any violent and sudden movement of the machinery owing to a high rate of speed, consisting of the bar B, pivoted to and supported by any desired number of rocker-arms, D D', in combination with the roller F and lever O, substantially as shown and described.

2. The combination, with the lever O, and means, substantially as described, for operating it, of the rock-shaft *b*, mounted upon a standard, the forked lever *a*, keyed upon the rock-shaft, and having the signals A A' on the outer ends of its limbs, the lever O, lying between the forks of the lever and operating the signals, as set forth.

3. The device for relieving the lever O when it is moving the forked lever *a*, and for holding the signals firmly in position, consisting of the springs *n n'*, bearing against the friction-block *r* on the rock-shaft *b*, in combination with the forked lever *a*, substantially as set forth and described.

4. The combination, with the swinging bar and signal operated indirectly by it, of the pivoted propeller described, having a rectifying-spring and an operating arm or lever, as set forth.

5. In combination with the inclined bar B and rock-arms D D', the arm P, in connection therewith and lever M and connections for operating an alarm whistle or gong on the engine, and the roller F and propeller on the engine, substantially as and for the purpose specified.

ALEXANDER M. AMOS.

Witnesses:
WILSON H. PIXLEY,
N. HODGE.