

(No Model.)

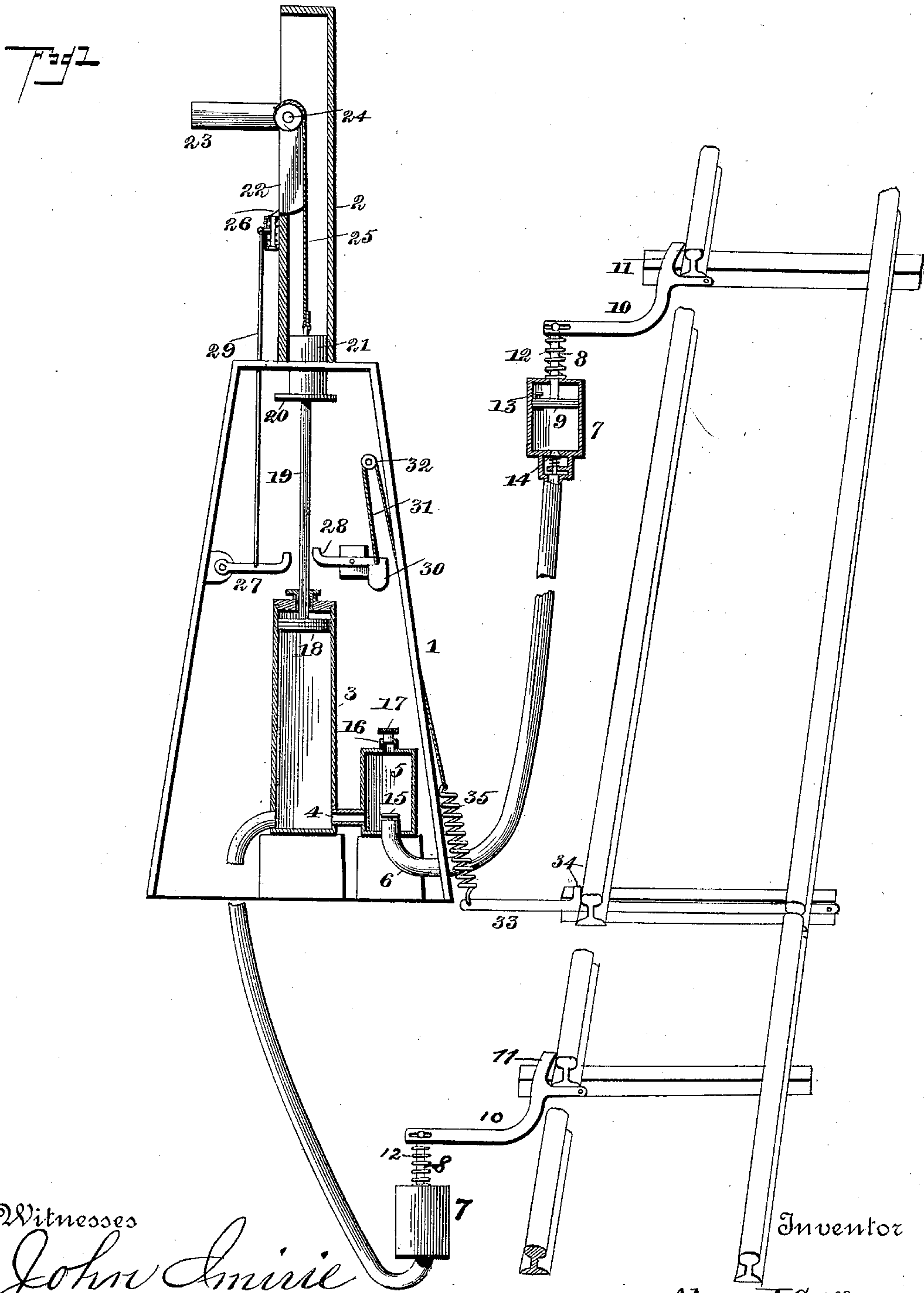
2 Sheets—Sheet 1.

A. J. GRIFFIN.

PNEUMATIC SIGNAL AND GATE FOR RAILWAYS.

No. 433,860.

Patented Aug. 5, 1890.



Witnesses

John Irvine
Wm. Baggers

By his Attorneys

Alonzo J. Griffin
C. A. Snow & Co.

Inventor

(No Model.)

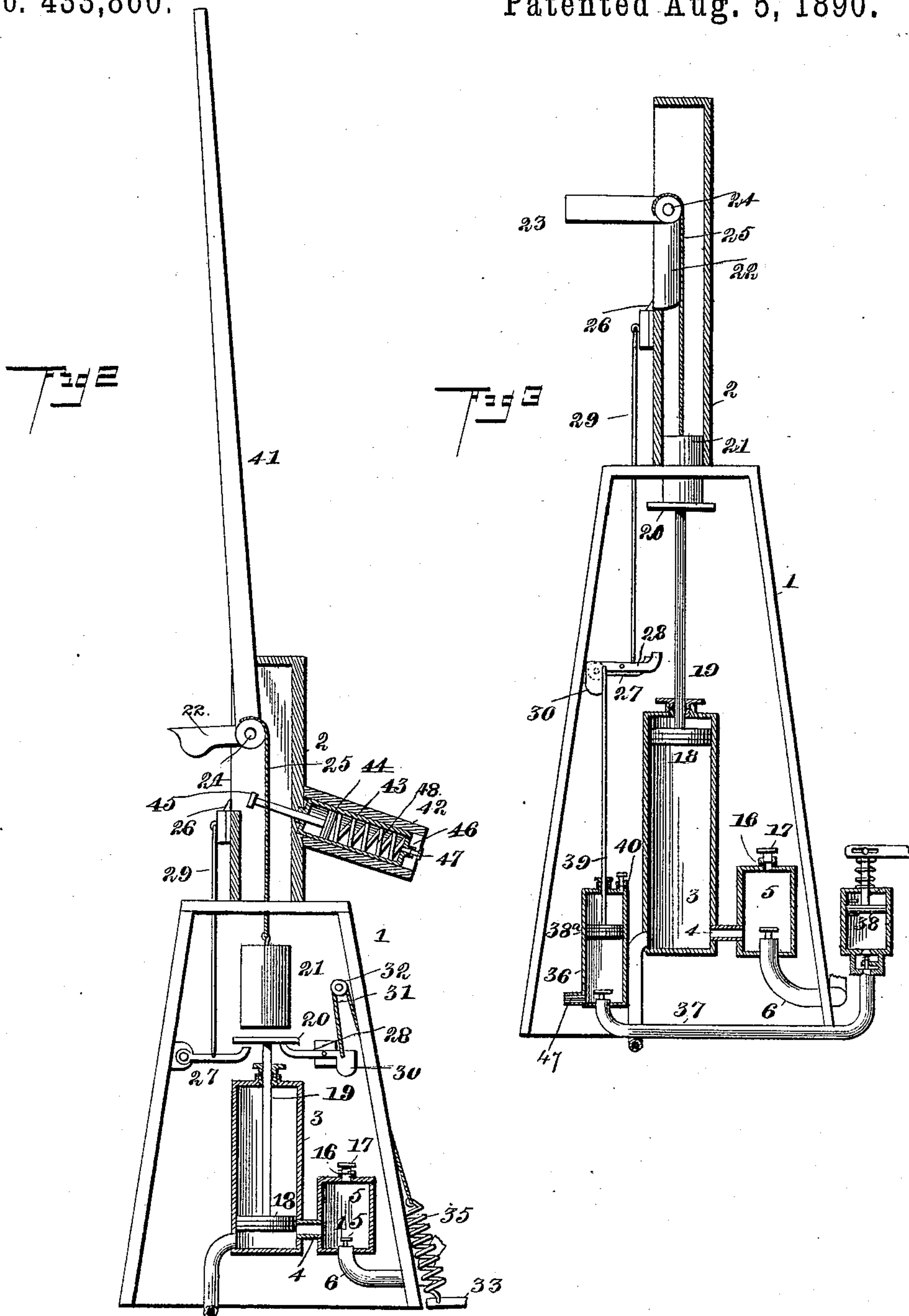
2 Sheets—Sheet 2.

A. J. GRIFFIN.

PNEUMATIC SIGNAL AND GATE FOR RAILWAYS.

No. 433,860.

Patented Aug. 5, 1890.



Witnesses

John Smilie
Wm. Bagger

Inventor
Alonzo J. Griffin

By his Attorneys

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

ALONZO J. GRIFFIN, OF WILKES-BARRÉ, PENNSYLVANIA.

PNEUMATIC SIGNAL AND GATE FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 433,860, dated August 5, 1890.

Application filed February 11, 1890. Serial No. 340,013. (No model.)

To all whom it may concern:

Be it known that I, ALONZO J. GRIFFIN, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Pneumatic Railway Signal and Gate, of which the following is a specification.

This invention relates to pneumatic railway-signals; and it has for its object to provide a device of this class which shall be operated automatically by passing trains and which shall be adapted to operate either a visual signal or a gate, such as are commonly used at railway-crossings.

The invention further has for its object to so construct the apparatus as to be capable of operating either as a block or as a time signal, as will be hereinafter more fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a sectional elevation of my improved pneumatic signal mechanism, showing also diagrammatically a portion of the track and of the operating mechanism. Fig. 2 is a sectional view illustrating more particularly the modification whereby my invention is made applicable to gates at railroad-crossings. Fig. 3 represents a further modification coming within the scope of my invention.

Like numerals of reference indicate like parts in all the figures of the drawings.

1 designates the signal-tower, which consists of a suitably-constructed casing having an upwardly-extending arm 2, in which the signal is located. The lower portion 1 of the casing contains a cylinder 3, which communicates through a pipe 4 with a vessel or reservoir 5, which latter communicates through a pipe 6 with the cylinder 7 of an air-tank, which is located adjacent to the track at a suitable distance—say ten hundred to twelve hundred feet from the signal-tower. The stem 8 of the piston 9 of the air-pump is pivotally connected with the lever 10, which is suitably pivoted, and which has an upward extension 11, adapted to be engaged by the wheels of passing cars to force the piston of the air-pump in a downward direction. A spring 12, coiled upon the piston-rod 8, serves to force the piston automatically in an upward direction. The piston 9 is provided

with a downwardly-opening valve 13, and the connecting-pipe 6 is to be provided with a suitably-located check-valve 14 to prevent backflow of the atmospheric fluid. The end of the pipe 6, which opens into the reservoir 5, is provided with an upwardly-opening valve 15, and the said reservoir is provided with a vent-valve 16, having a screw-cap 17, which may be adjusted to regulate the escape of air from the said reservoir.

It will be observed that by the mechanism just described when a train passes the point of the track where the air-pump 7 is located the said air-pump will be operated to force air through the pipe 6 into the reservoir 5, and from the latter through the pipe 4 into the lower end of the cylinder 3. The latter is provided with a piston 18, the stem of which 19 carries at its upper end a table or platform 20. The latter serves in operation to support a weight 21, by means of which the signal is operated, as will be hereinafter more fully described.

The signal used in connection with my invention is practically a semaphore comprising two arms, 22 and 23, that extend radially from a shaft 24, which is journaled transversely in the upwardly-extending arm 2 of the casing. Said arm or upper portion of the casing is of a width slightly exceeding the width of the arms of the semaphore, and the side of the portion 2 of the casing is opened so as to permit either arm of the semaphore to swing outwardly to a horizontal position. It will be seen that by the construction described when either one of the semaphore-arms 22 or 23 is in a horizontal position the other arm is entirely concealed within the casing; hence there can be no possibility of mistaking one signal for the other, because the signal which is not actually exposed at any one time is completely and perfectly concealed from view. My invention differs in this respect from semaphoric and other signals such as are usually employed, which merely change their relative position, and consequently render mistakes more or less liable to occur.

Suitably attached to the shaft 24 is one end of a rope or chain 25, to the other end of which the weight 21 is attached. The rope or chain 25 is partially wound on the shaft 24,

and it serves when the weight 21 is lowered to hold the arm 23 of the semaphore, which is the danger-signal, in a vertical position and concealed within the casing, while the arm 22, which indicates that the road is clear, is in a horizontal and plainly-visible position. When the weight 21 is raised, the weight of the arm 22 causes the shaft 24 to turn, and the said arm 22 drops into the casing 2, while the arm 23 or danger-signal assumes a horizontal position and extends from the casing so as to be plainly visible. When the arm 23 assumes this position, the rope 25 is partially wound upon the shaft 24, so that when the weight 21 is again lowered the unwinding of the rope from the shaft 24 shall cause the signal to re-assume its normal position.

Suitably secured at the lower edge of the slot or opening in the side of a portion 2 of the casing is a beveled spring-actuated latch 26, which when the arm 22 drops into a vertical position engages the said arm and holds it securely until it shall be released by mechanism which will be presently more fully described.

Suitably pivoted in the portion 1 of the signal tower or casing are two levers, designated, respectively, by 27 and 28. The lever 27 is connected by a link 29 with the lower end of a spring-actuated latch 26, and the free end of said lever 27 serves to support the platform or table 20 at the upper end of the piston-rod 19 when the latter is in a lowered position. The lever 28 is provided at one end with a weight 30, and the other end of said lever is extended upwardly a short distance above the inner end of the lever 27. It will thus be seen that when the piston-rod 19, carrying the platform 20, descends it will remain supported upon the inner end of the lever 28 until the weighted end of the latter is raised, thereby permitting the piston-rod to descend still farther, until the platform 20 comes into contact with the inner end of the lever 27. This operation of the lever 28 may be accomplished by means of a rope or chain 31, attached to the inner end of said lever, passing over a guide-pulley 32, and connected with one end of a lever 33, which is pivoted transversely across the railroad-track, and is provided with an upward extension 34, adapted to be engaged by the wheels of passing trains. The rope or chain 31 is preferably provided with a spring 35, in order to prevent any sudden and jarring movement which might injuriously affect the operating mechanism.

In the foregoing I have described but a single air-pump 7, located adjacent to the track at one side of the signal-tower; but it is obvious that a similar air-pump will be arranged at a suitable distance from the signal-tower on the opposite side of the latter and be connected by a conducting-pipe 6 either with the reservoir 5 or directly with the lower end of the cylinder 3. The latter construction has been illustrated in the drawings; but it is

obvious that the result will be precisely the same if the connection of the second pipe 6 were made with the reservoir 5, which is merely a receptacle to afford increased capacity for compressed air. If a double track is used, one of the air-pumps will be located adjacent to each track.

The length of the rope carrying the weight 21 should be so proportioned as to cause the weight to remain suspended a short distance above the table or platform 20 when the latter rests upon the inner end of the lever 27.

The operation of this part of my invention will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. When a train passing in either direction reaches the point at which one of the air-pumps 7 is located, said air-pump is operated in the manner described, and air is forced through the pipe 6 into the reservoir 5 and the lower end of the cylinder 3, thereby forcing the piston 18, piston-rod 19, and platform 20 in an upward direction. The platform 20 intercepts the weight 21, raising the latter, and consequently permitting the shaft 24 to rotate, actuated by the weight of the semaphore-arm 22, thus immediately exposing the danger-signal. The arm 22 engages the spring-actuated latch 26, and is thereby locked, thus locking the danger-signal in its exposed position. As soon as the train has passed the point at which the air-pump is located the latter ceases to be operated, and the air contained in the cylinder 3 and reservoir 5 now escapes through the vent-valve 16, causing the piston 18 and its attachments to be gradually lowered, actuated by the weight of the platform 20. When the platform 20 begins to descend, it leaves the weight 21, which remains suspended from the cord 25. The platform 20 continues to descend until it is intercepted by the inner end of the lever 28. Here it remains blocked until the train passes the point of the track where the lever 33 is located, and which is usually opposite to the signal-tower. When the lever 33 is actuated, it serves to release the lever 28 from engagement with the platform 20, and the latter is thus permitted to descend still farther until it engages the lever 27, pressing the inner end of the latter in a downward direction and causing the spring-actuated latch 26 to be released by the action of said lever and the connecting-link 29. As soon as the latch 26 is released from engagement with the arm 22 the weight 21 overbalances the weight of the semaphore-arm 23, causing the shaft 24 to oscillate in its bearings, and the said arm 23 to be raised into the part 2 of the casing and the arm 22 of the semaphore to re-assume its normal position.

In Fig. 3 of the drawings I have illustrated a modification, which consists in locating in the casing 1 an air-cylinder 36, which is connected by a pipe 37 with an air-pump 38 located at the part of the track which it is desired that the train shall reach before the

danger-signal is released. This air-pump is to be operated in precisely the same manner as the air-pump 7, hereinbefore described. The cylinder 36 has a piston 38^a, the rod of which 39 is connected with the weighted end of the lever 30. A vent-opening 40, suitably located, is provided, through which the air may escape from the cylinder 36. It will be seen that by this mechanism, when the train reaches the point of the track at which the air-pump 38 is located, air is forced into the cylinder 36, forcing the piston 38^a and piston-rod 39 in an upward direction and raising the weighted end of the lever 30, which has the effect of permitting the platform 20 to descend and engage the lever 27, as hereinbefore described. The cylinder 36 is provided with a vent 47, through which air may escape. It is obvious that as soon as the air escapes from the cylinder 36 and the piston 38^a descends the weighted end of the lever 30 again assumes its normal position. It is not essential that the weighted end of the lever 30 should be directly connected with the piston-rod 39, inasmuch as the latter may be simply arranged vertically below the weighted end of said lever and operate the latter by merely coming in contact therewith.

The forms of my invention thus far described are applicable mainly to visual signals; but my invention may be equally well adapted to the operation of railroad-gates to form barriers to intercept the traffic at railroad-crossings on the approach of trains. An apparatus adapted to this purpose has been illustrated in Fig. 2 of the drawings, and the construction of the operating mechanism of this apparatus, apart from its being made stronger and heavier than if intended merely to operate a semaphore, is identical with that of the apparatus hereinbefore described. For the danger-arm 23 of the semaphore is substituted a suitably-constructed bar or gate 41. When this gate is used, the weight 21 must be sufficiently heavy to overbalance the same, when the arm 22 is released from the catch 26. In this case the part 2 of the casing is also provided with a laterally-extending chamber 42, within which is located a cylinder 43, having a piston 44, the stem of which carries a cushion 45 to receive the impact of the arm 22 when the gate 41 is lowered to a horizontal position. The cylinder 43 is arranged in an inclined position, and it has at its lower or outer end a vent-valve 46, having a screw-cap 47, by means of which the escape of air from the said cylinder may be regulated. This device serves to receive the weight of the gate when the latter is swung to an open position, and prevents any sudden jar that might prove injurious to the mechanism. A suitably-arranged spring 48 serves, when the gate is raised or restored to its normal position, to force the piston 44 in an outward direction in the cylinder, where it is ready for a repetition of the operation.

It will be seen from the foregoing descrip-

tion that my invention provides what is termed a "block-signal," which is released automatically by passing trains when they reach a predetermined part of the track. My invention, however, may be converted into what is known as a "time-signal" by simply dispensing with the lever 28 and the operating mechanism for the latter. The mechanism may then be set by properly adjusting the vent-valve 16, so as to release the danger-signal at the expiration of any predetermined period, which may be very accurately gaged by the length of time suffered to be consumed by the escape of the air contained in the cylinder 3 and receptacle 5.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood. The construction and operation are simple, and the apparatus is not liable to get out of order. If any part of the apparatus should become disarranged and refuse to work, it cannot fail to be instantly noticed; and in the event of breakage of the rope 25 the danger-signal will be immediately exposed, thus giving notice and timely warning of the fact.

Having thus described my invention, what I claim is—

1. In a railway-signal, the combination, with a suitable casing, of a transverse shaft having radially-extending arms at right angles to each other, a rope or chain partially wound upon said shaft and having a weight attached to its free end, and a spring-actuated latch adapted to engage the lower arm, substantially as set forth.

2. In a railway-signal, the combination, with a suitable casing, of a transverse shaft having radially-extending arms at right angles to each other, a rope or chain wound upon said shaft and having a weight attached to its free end, a cylinder having a vertically-movable piston adapted to force said weight in an upward direction, and an air-pump adapted to be operated by passing trains and connected by a suitable pipe with the said cylinder, substantially as set forth.

3. In a railway-signal, the combination, with a suitably-constructed casing, of a transverse shaft having radially-extending arms at right angles to each other, a spring-actuated latch adapted to engage the lower arm, a rope or chain partially wound upon said shaft and having a weight, an air-cylinder arranged below said weight, the piston-rod movable vertically in said cylinder and having a platform adapted to support the said weight, an air-pump adapted to be operated by passing trains and to force air into the lower end of said cylinder, and mechanism for automatically releasing the spring-actuated latch by the descent of the piston-rod carrying the platform, substantially as set forth.

4. The combination of a shaft having the radially-extending signal-arms, the rope or

chain partially wound upon said shaft and carrying a weight, the cylinder arranged below the latter, the vertically-movable piston-rod carrying the platform, adapted to support said weight, a reservoir connected with said cylinder and having a vent-valve provided with a regulating-cap, a suitably-located air-pump adapted to be operated by passing trains, and a pipe connecting said air-pump with the reservoir or cylinder aforesaid, substantially as set forth.

5. The combination, with the shaft having radially-extending arms at right angles to each other, of the rope or chain partially wound upon said shaft and having a weight at its free end, a spring-actuated latch adapted to engage the lower arm, the air-cylinder having the vertically-movable piston-rod carrying a table adapted to support the said weight, a lever arranged in the path of said table, and a link connecting said lever with the spring-actuated latch, substantially as set forth.

6. In a pneumatic railroad-signal, the combination, with the shaft having radially-extending arms at right angles to each other, of the rope or chain partially wound upon said shaft and having a weight at its free end, a spring-actuated latch adapted to engage the lower arm, the air-cylinder having the vertically-movable piston-rod carrying a table adapted to support the said weight, a lever arranged in the path of said table, a link connecting the said lever with the spring-actuated latch, and the block-lever arranged in the path of the vertically-movable table slightly above the latch-lever, and mechanism adapted to be actuated by passing trains to release the said block-lever, substantially as herein set forth.

7. In a pneumatic railway-signal, the combination of the shaft having the radially-extending signal-arms, the spring-actuated latch to engage one of said arms, the latch-lever suitably connected with said latch, and the block-lever weighted at its outer end and having its inner end adapted to be extended slightly above the inner end of the latch-lever

in the path of a table or platform at the upper end of the piston-rod of the air-cylinder, by which the signal is operated, substantially as set forth.

8. The combination, with the rock-shaft having radially-extending arms at right angles to each other and the upper one of which forms a gate or barrier, of a rope or chain partially wound upon said shaft and having a weight at its free end, an air-cylinder having a longitudinally-movable piston, the stem of which is located in the path of the lower arm, and a spring to force the said piston automatically in an outward direction, substantially as set forth.

9. In a railway signal or gate, the combination of the semaphore, consisting of a shaft having two arms at an angle to each other, a weight connected to the shaft to partially rotate the same, a spring-actuated latch to lock the lower arm of the signal, said latch to be withdrawn by the descent of the weight, a cylinder having its piston adapted to force said weight in an upward direction, and an air-pump adapted to be operated by passing trains and connected by pipes with the cylinder, as set forth.

10. In a railway signal or gate, the combination of the shaft having two arms at an angle to each other, a weight connected to the shaft to partially rotate the same, pneumatic apparatus to act upon one of the arms, for the purpose set forth, a spring-actuated latch to lock the lower arm of the signal, said latch to be withdrawn by the descent of the weight, a cylinder having its piston adapted to force said weight in an upward direction, and an air-pump adapted to be operated by passing trains and connected by pipes with the cylinder, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

ALONZO J. GRIFFIN.

Witnesses:

J. H. SIGGERS,

R. J. MARSHALL.