(No Model.)

3 Sheets—Sheet 1.

J. WAYLAND.

RAILWAY TIME SIGNAL.

No. 447,989. Patented Mar. 10, 1891.

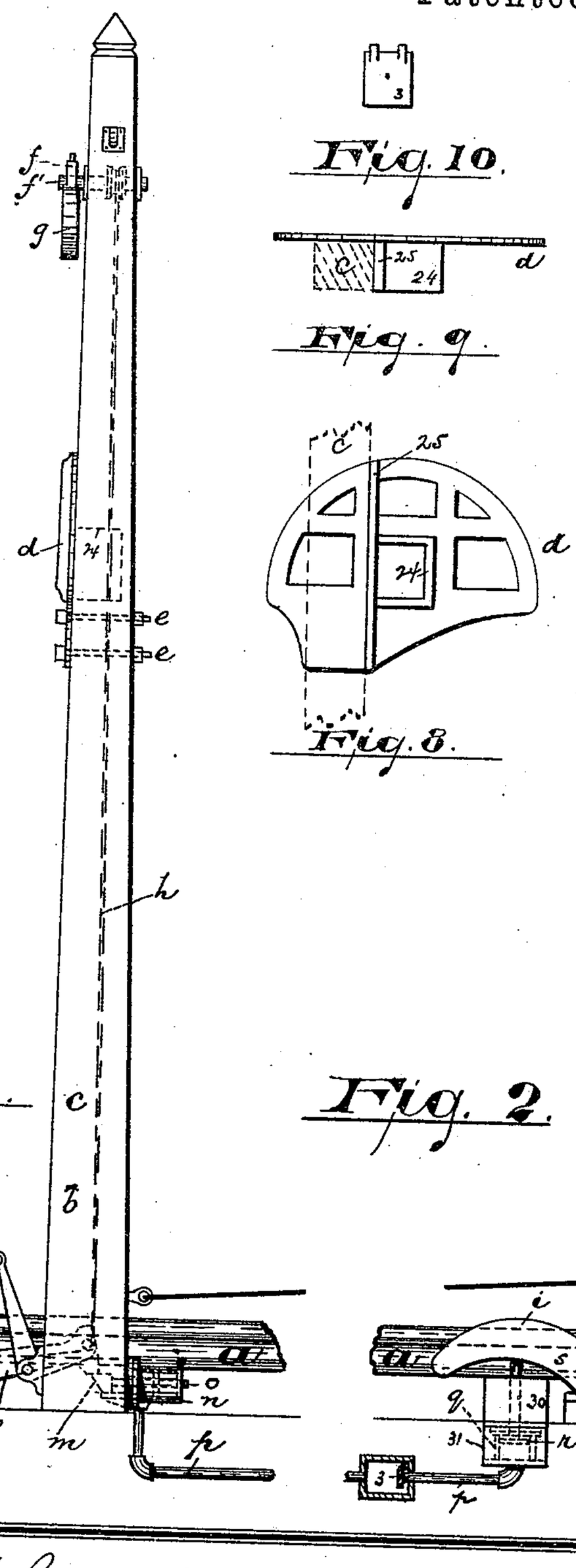

Fig. 1.

Fig. 10.

Fig. 9.

Fig. 8.

Fig. 2.

Witnesses

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(No Model.)

3 Sheets—Sheet 2.

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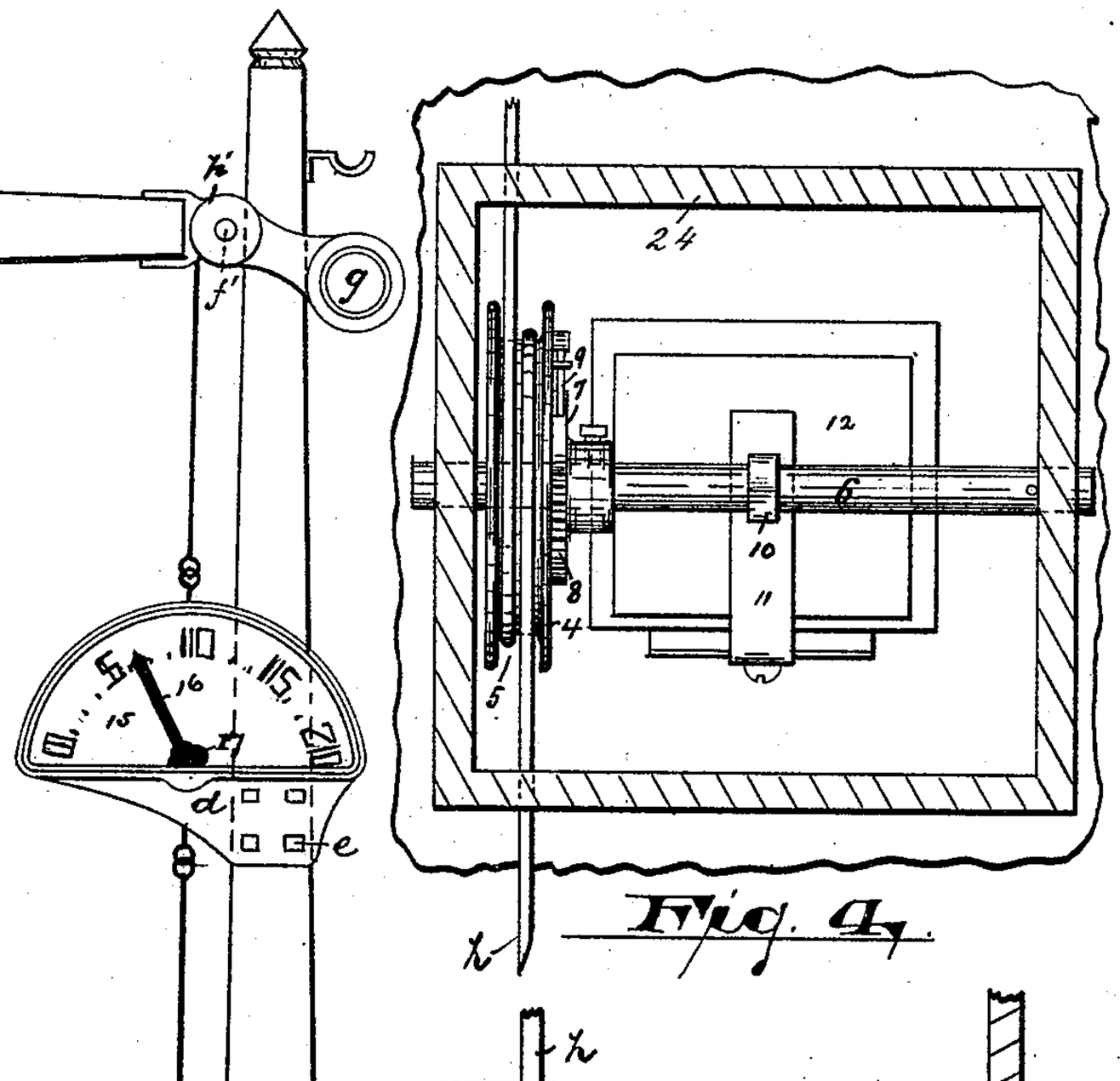

Fig. 4.

Fig. 3.

Fig. 5.

Witnesses

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 6.

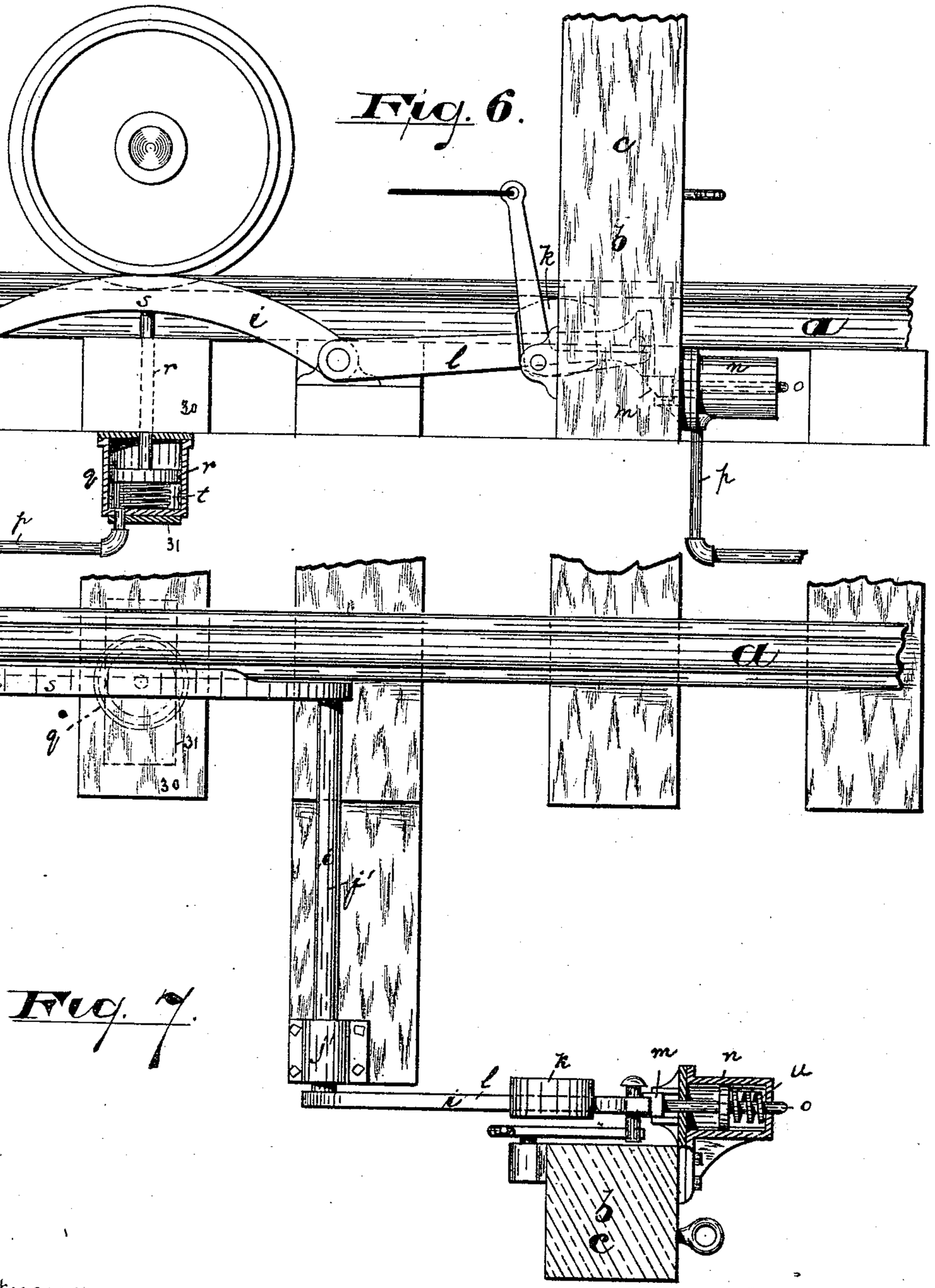

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

JAMES WAYLAND, OF NEWARK, NEW JERSEY.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 447,989, dated March 10, 1891.

Application filed July 28, 1890. Serial No. 360,140. (No model.)

To all whom it may concern:

Be it known that I, JAMES WAYLAND, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Signaling Apparatus for Railroads; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

The object of this invention is to simplify the construction of railway time and semaphore signals and to secure a more certain, positive, and effective operation of parts of the same, whereby the danger occurring because of accidental disarrangement or inoperativeness may be more certainly avoided; to reduce the cost of construction and to enable the parts to be assembled at the roadside with greater ease and facility; to secure an improved method of releasing certain catch mechanisms, and to provide or obtain other advantages and results, some of which will be set forth in connection with the description of the working parts of the apparatus.

The invention consists in the improved railway signaling apparatus or mechanisms and in the arrangements and combinations of parts, substantially as will be hereinafter set forth, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters indicate corresponding parts in each of the several figures, Figure 1 is a side elevation of a signaling-station, which may be taken as the one at the beginning of a given "block" of the road and showing the semaphore in a position indicative of danger. Fig. 2 is a similar view showing the semaphore at the end of the block, the semaphore being turned from the danger-indicating position. Fig. 3 is a front elevation of said station. Fig. 4 is a section showing the clock mechanisms in rear elevation, the back of the box containing said clock mechanisms being removed. Fig. 5 is a central vertical section taken on the axial center of the hand-arbor. Figs. 6 and 7 are detail views, enlarged, showing the construction and arrangement of a certain lever and co-operating parts more fully. Fig. 8 is a detail rear view of a frame for the time-signaling mechanisms, and Fig. 9 is a plan of the same. Fig. 10 is a face view of a certain valve, showing a vent hole or perforation therein.

In said drawings, *a* indicates a railway, and *b b* are signaling-stations thereon, at which the engineer of the moving train is advised of the approximate location of the advance train or as to whether or not it is within a danger limit in its relation to his train, and is also advised of the time which has elapsed since its passage from the station the said engineer is about to pass. The said stations consist of posts *c*, which are preferably of wood and may be the posts employed by the railway authorities prior to the adoption of my improvements. Said posts are firmly fixed or embedded in the ground or in other suitable situation and have arranged thereon the clock-frames *d*, which are secured to said posts by bolts *e e* and project toward the railway-track in the manner indicated in Fig. 3, so as to be more easily and clearly seen by the engineer.

By being bolted onto the post in the manner indicated the clock-dial and accompanying mechanisms can be readily placed in position on the post after the latter has been set up and be removed therefrom for the purpose of repair, or for other purposes, without disturbing the post or the co-operating mechanisms arranged in connection therewith. On said posts above the time-signals are also arranged semaphores *f*, which are pivoted as at *f'*, and provided with weights *g*, which more than counterbalance the weight of the semaphore-blade and normally hold the same in a position indicating "danger" and allow said blades to drop or turn to a position indicative of safety when drawn by the power of a certain weight on the lever *i*.

The semaphore and clock mechanisms are controlled by a rope, cord, wire, or other similar flexible connecting means *h*, which extends from an annular or pulley-like formation *h'* on the semaphore or on the shaft or pivot *f'* thereof, as indicated in Figs. 1, 2, and 3, downward at the side of the post *c* to

the clock mechanisms, where said connection *h* is jointed to allow the removal of the portion thereof intimately connected to and engaging the clock mechanisms with said clock when the latter is taken from the post, as hereinbefore referred to. From the clock the connecting wire or cord *h* extends downward and is fastened upon the arm *l* of the lever *i*, which said lever is adapted to be operated by the passing train, so as to relieve the semaphore of tension or draft of the said cord and allow the said semaphore to turn to the position indicative of danger. The said lever *i* consists of a rock-shaft *j*, arranged in a suitable box or boxes *j'*, or other suitable bearings, at the opposite ends of which are the arms *s* and *l*, the former lying at the side of the track approximately parallel therewith, as shown in Figs. 6 and 7, and normally extending above the same, so as to receive the pressure of the wheels, and the latter extending to a point beneath the clock, so as to receive the connecting cord or wire *h*.

Upon the arm *l* is arranged an adjustable weight *k*, by means of which the lever will be automatically forced to its normal position when released and the semaphore be drawn to the position indicative of safety. Said weight *k*, for containing the clock mechanism, is made adjustable, so as to vary its power on the lever and provide for differences in conditions occasioned by changes in temperature, moisture, &c.; but I may dispense with the adjustable weight and make the immovable extremity of the arm *l* (immovable in its relation to the body of the lever) of sufficient weight to effect the desired results.

When the arm *l* of the lever is raised by the passing train, as shown in Figs. 1 and 6, the same is caught and held by a spring-catch *m*, arranged to enter into holding engagement with said lever automatically, to prevent the said lever from dropping under the power of its weight immediately after the passage of the train thereover, and drawing the semaphore to a position indicative of safety. On the other hand, the said catch keeps the said arm *l* up, so that the weight *g* may hold the said semaphore at the danger-indicating position during the passage of the train from end to end of the block in advance of the station the train is about passing. The especial means which I have herein provided for releasing the lever after the train has passed from the said block and allowing the semaphore to again indicate a safe or clear road ahead, are pneumatic mechanisms, (shown more clearly in Figs. 1, 2, 6, and 7,) where *n* indicates a pneumatic cylinder and *o* a piston arranged in said cylinder and carrying the said catch *m*. *p* indicates an air-duct, preferably of ordinary iron piping, connecting with a cylinder *q* at the forward or first station of a block, and *r* indicates a piston arranged in said cylinder *q* and extending vertically therefrom into engagement with the arm *s* of the lever *i*, so as to be forced downward by said arm, when the latter is depressed by the passing train. When thus forced downward, as the train leaves the block the piston *r* forces a body of air through the air-duct to the rearward to the cylinder *n* of the catch mechanism, forcing the piston thereof backward from the lever and the catch from holding relation to the lever, so that the arm *l* will drop and the arm *s* rise to a position to be engaged by the next train, as will be understood.

When not in its holding relation to the lever *i*, the catch bears constantly against the arch or curved extremity of the lever-arm *l*, the said arch being made concentric to the rock-shaft *j*, so that pivotal movement will not effect the catch and its piston, to throw the same by sudden concussion, but when said lever is thrown by the train, the same is simply raised above the catch, and the latter is merely forced by the spring *u*. The piston *r* is preferably cushioned on a spring *t*, Fig. 6, which also assists the weight *k*, and the piston *o* is provided with a spring *u*, Fig. 7, by means of which the catch is forced into holding engagement with the lever *i*.

A valve 3, Fig. 2, may be provided in the duct *p*, near to the cylinder *q*, adapted to prevent the piston from springing back immediately should the lever fail to be caught, but said valve is provided with a small perforation to allow a slow escape of air back to the cylinder *n*.

In Figs. 4 and 5 is shown the improved clock mechanism, adapted to be readily removed without disturbing the post. In said figures, 4 indicates a wheel having a peripheral groove 5, in which the connecting cord or wire *h* is secured, so that as said cord moves longitudinally it will turn the said wheel on its shaft or pivot 6. The said wheel, however, is loose on said shaft, so as to move independent thereof in one of its movements. To said wheel is secured a pawl 7, which engages a ratchet-wheel 8 on said shaft, being held into engagement by a spring 9. An upward movement of the cord or wire causes the pawl to engage the teeth of the ratchet-wheel and to turn the same; but a return movement of the said cord or wire, moving the wheel in an opposite direction, causes the pawl to slide over the ratchet-teeth inoperatively or without turning said ratchet-wheel and the shaft to which it is affixed. Upon the shaft 6 is arranged a cam 10, of the triangular shape shown in Fig. 5. This engages an arm 11 on the clock-movement frame 12, which engages in turn the extremity of the shaft 13, which last extends through the hollow main arbor 14 of the clock-movement in a manner described by me in a prior specification, filed May 13, 1890, Serial No. 351,689. The extremities of the parts 13 and 14 extend through the dial-plate 15, and are provided with means whereby a clamp for holding the hand or pointer 16 is formed. When the clamp is open, the hand is free to revolve on the shaft 13 under the

power of a weight 17 to an initial position. When the clamp is closed under the effectual power of the spring 18, the said hand is forced to revolve with the hand-shaft 14 under the exerted power of ordinary clock-work geared to said shaft in any ordinary manner. The spring-actuated clock-work being common and ordinary, the same is not shown in connection with the hollow hand-shaft. On the upward movement of the cord *h*, caused by the passage of the train past the station, the wheel 4 is turned and with it the ratchet-wheel 8, and the cam 10 is forced over one of its angles to its next face, throwing the arm 11 forward, and with it the shaft 13, thus opening the clamp and allowing the hand to turn to its initial position. The movement of the clock-work, however, is not interrupted, and immediately on the hand being reclamped the hand begins to move forward from the said initial point to indicate the time, the beginning of the forward movement of said hand being cotemporaneous with the passage of the train past the station. At the "twenty-minutes" mark of the dial-plate the further movement of the hand may be stopped.

The time-signal frame and case is, as has been before indicated, removable from the post, and is of peculiar construction. It consists of a semicircular casting (shown in Figs. 8 and 9 more clearly) having the box 24 formed integrally thereon at the rear in the center thereof. At one side of said box is a vertical flange 25, which, together with the semicircular front plate, forms an angle in which the angular post *c* lies. By this construction the clock may be bolted to the post readily and with great firmness. The cylinder *q* is held in fixed relation to the sleeper 30 and rail *a* by means of a saddle box or hanger 31, Fig. 3, bolted firmly to the under side of the extended end of said sleeper or tie. Thus when the track is moved by the passing train or by the effect of frost the cylinder will be moved therewith and no differences will be made in the distance of movement of the lever and the parts depending thereon.

Having thus described the invention, what I claim as new is—

1. In a railway-signal, the combination, with a hand and means for clamping the same, of a revolving cam or eccentric projection, a ratchet and pawl, and means for turning said ratchet and pawl and communicating the motion to the cam, substantially as set forth.

2. In a railway-signal, the combination, with the hand and clamping shafts, of a triangular cam and means for revolving or turning the same, substantially as set forth.

3. In a railway-signal, the semicircular frame or plate *d*, having the integral box 24 for the clock mechanism, and vertical flange 25 at the rear thereof, substantially as and for the purposes set forth.

4. In combination with a railway, posts *c c*, having a semaphore *f* and time-signals thereon, levers *i*, connecting by flexible connections with said signals, a catch *m* for holding said lever, a cylinder and piston for operating the catch, and a duct *p*, connecting a cylinder *q* and piston *r*, adapted to be operated by the passing train to force the body of air into said cylinder *n* to force back the catch from holding relation to the lever, substantially as set forth.

5. In a railway signaling system, the combination, with a catch for holding the signal at a position indicative of danger, of a piston and cylinder stationed at a distance from said catch, and a duct connecting with the catch, whereby a body of air may be forced through said duct and the catch forced from its holding engagement with the signal, substantially as set forth.

6. In a railway-signal, the combination, with the railway, of a signal and a lever connecting with the same, a catch *m*, piston *o*, cylinder *n*, duct *p*, valve 3, cylinder *q*, piston *r*, and lever to engage the same, all arranged and combined substantially as and for the purposes set forth.

7. The improved railway time-signal, combining therein a post, a clock, and above the same a pivoted semaphore having a weight at one side of the pivot and a signaling-blade at the other, a weighted lever arranged adjacent to the track to be operated by the passing train, the weight of which lever overbalances the weight of the semaphore and draws said semaphore to a position indicative of safety, and a flexible cord extending from the semaphore down to the clock mechanisms and connecting with said clock mechanisms to enable the semaphore to operate the clock as said semaphore moves from a position of safety to that of danger, and said cord extending downward to the said lever at the foot of the post and connecting therewith, all said parts being arranged and adapted to operate substantially as and for the purposes set forth.

8. The improved railway-signal herein described, combining therein a post having a semaphore pivoted thereon, a clock secured on said post at a distance therefrom, a weighted lever *l*, arranged at the foot of said post and adapted to be operated upon by the passing train, whereby the weight thereon is thrown up, a catch for holding said weight in its elevated position, and a flexible cord connecting the weighted lever with the clock and the clock with said semaphore, whereby when the said cord is released of the tension or draft of said weighted lever the semaphore will operate automatically to allow the clock-hands to move to an initial position, substantially as set forth.

9. In a railway time-signal, the combination, with a clock arranged on the signal-post and having hand-clamps and hands, and mechanisms for operating the same, of a semaphore independent of said clock but connected to and controlling the same, and a weighted lever arranged at the foot of the post and adapted to

be actuated by the passing train and connected to and normally holding said semaphore to a position indicative of safety, said parts being arranged and operating substantially as set forth.

10. In combination with the semaphore, a lever adapted to be operated on by the passing train and controlling said semaphore, a connection *h*, and a weight adjustably arranged on said lever, substantially as and for the purposes set forth.

11. In a railway-signal, the combination, with the signaling apparatus, of a lever adapted to be operated by the passing train and having a curved extremity the bearing of which is concentric to the center of movement, and a catch bearing on said concentric extremity, substantially as and for the purposes set forth.

12. The improved railway time-signal, the combination of the lever *i*, semaphore controlled thereby, cord *h*, connecting said semaphore with the wheel 4, said wheel, a ratchet and pawl, shaft 6, cam 10, clock-hand shaft 14, spring-actuated shaft 13, and hand 16, all arranged and operating substantially as and for the purposes set forth.

13. In a railway-signal, the combination, with a lever adapted to be operated upon at the passing of a train, of a semaphore arranged at the top of a signal-post and controlled by the said lever and being held in a position indicative of safety thereby, and a clock connected to the said semaphore, but arranged at a distance therefrom and having clamped hand and means for operating the same and means for unclamping said hand, the latter of said means being controlled by said semaphore, whereby when said semaphore turns to its position indicative of danger the said hand will be allowed to turn to its initial position, substantially as herein described.

14. In a railway-signal, the combination, with the hand and clamping-shafts, of a wheel 4, adapted to be operated at the passing of a train, a pawl 7, arranged on said wheel, and a shaft 6, having a ratchet-wheel and cam thereon, all arranged and combined substantially as and for the purposes set forth.

15. In a railway-signal, the combination, with the signal-post *c*, of a metal dial-frame *d*, secured to said post and having an integral box and plate at the rear thereof forming an angle for the reception of the said post, the said box being formed centrally on said dial-frame and having time signaling clock mechanisms therein, substantially as set forth.

16. In a railway-signal, the combination of the signaling apparatus, lever *i* and catch for holding the same, piston and cylinder operating said catch, and pneumatic duct, and piston and cylinder for forcing air through said duct, and a perforated valve 3, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of July, 1890.

JAMES WAYLAND.

Witnesses:
CHARLES H. PELL,
OSCAR A. MICHEL.