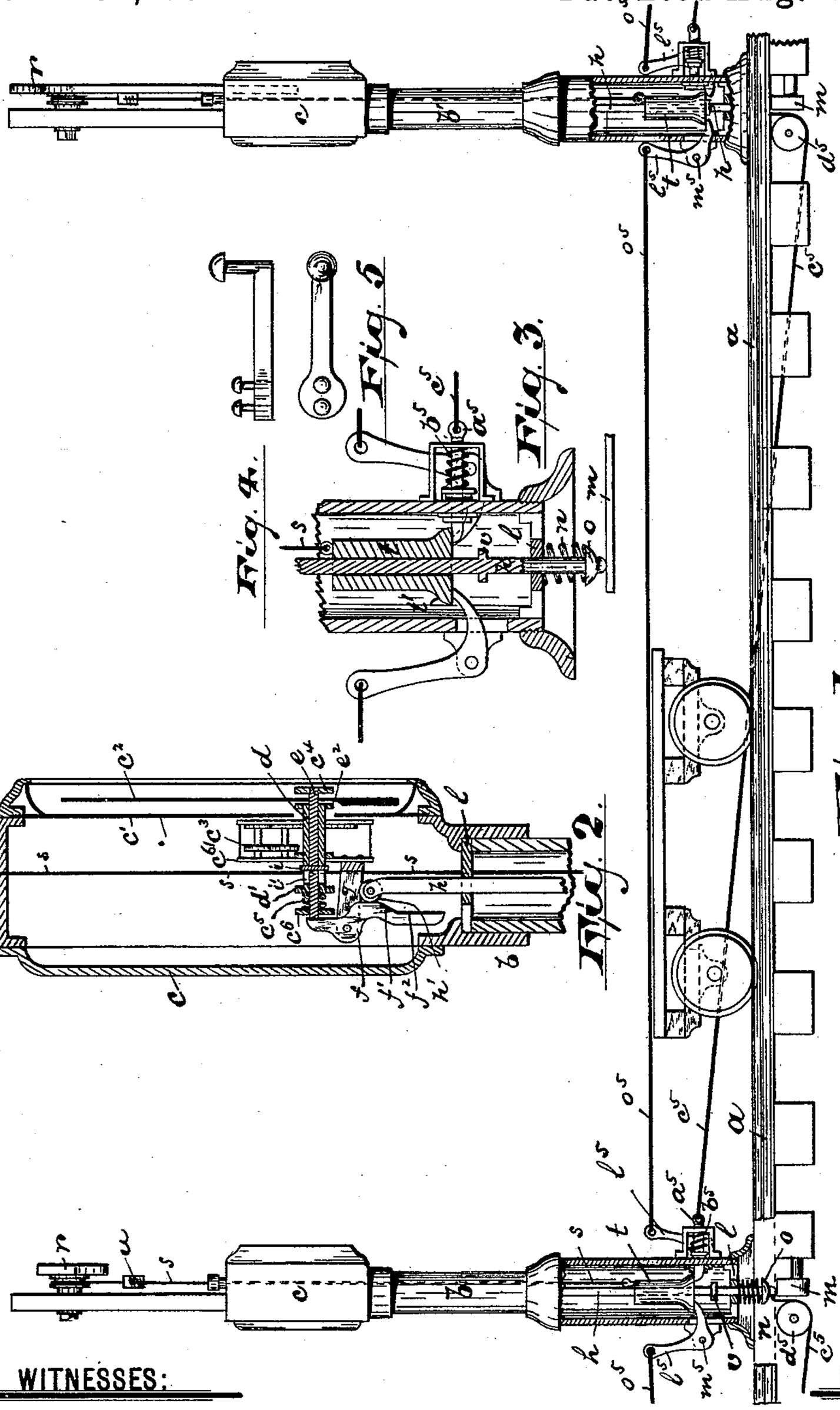
(No Model.) 3 Sheets—Sheet 1.

J. WAYLAND.

RAILWAY TIME SIGNAL.

No. 457,175. Patented Aug. 4, 1891.



WITNESSES:

Oscar A. Trickel

L. H. Scott.

INVENTOR:

James Wayland,

BY Drake & Co. ATTY'S.

(No Model.) 3 Sheets—Sheet 2.

J. WAYLAND.

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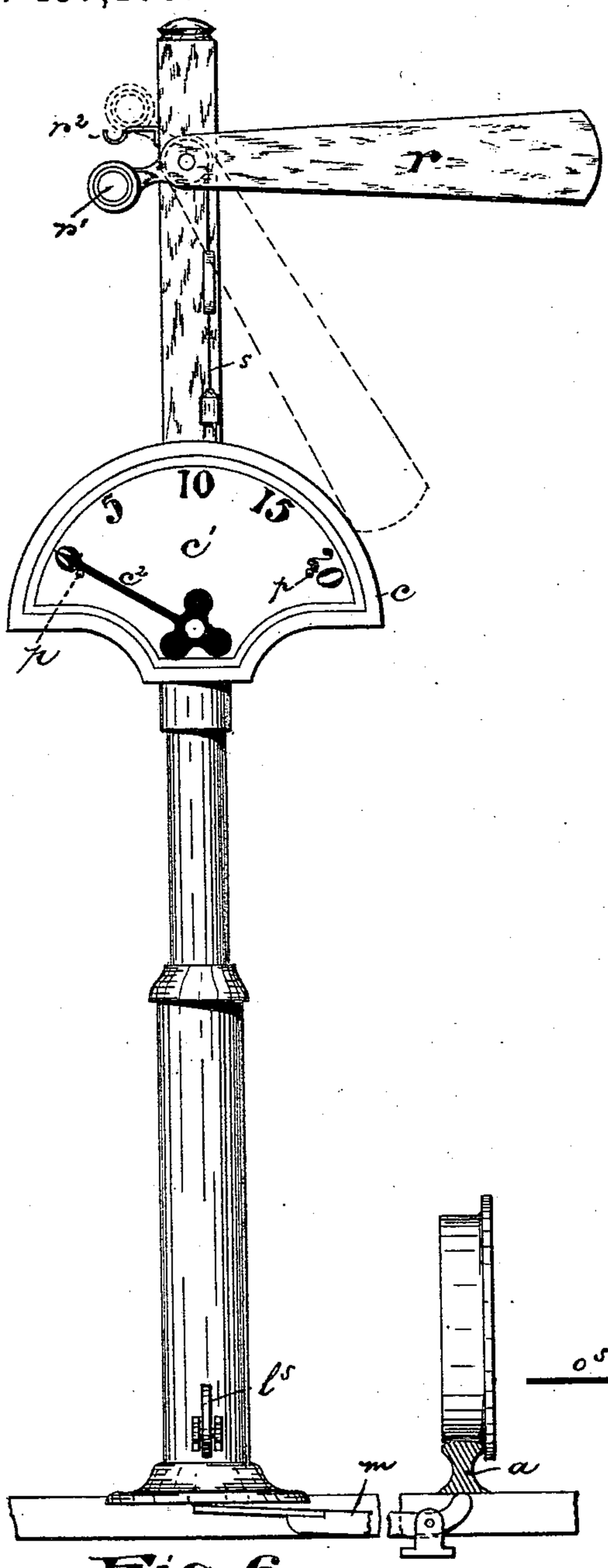

Fig. 6.

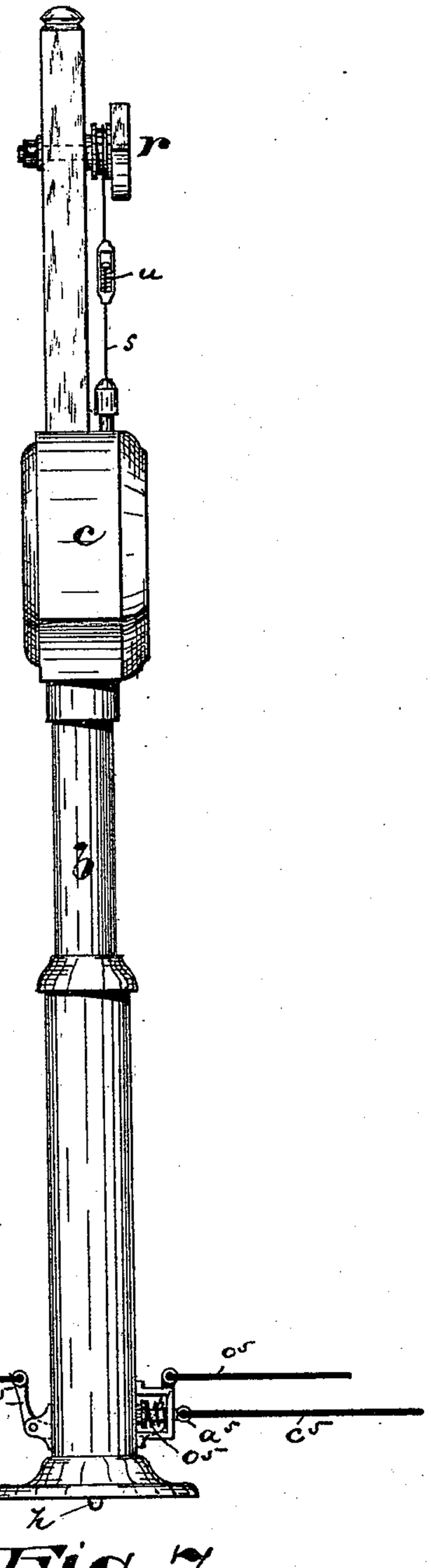

Fig. 7.

WITNESSES:

Oscar A. Trichel

L. W. Scott

INVENTOR:

James Wayland,

BY Drake & Co., ATTY'S.

(No Model.) 3 Sheets—Sheet 3.

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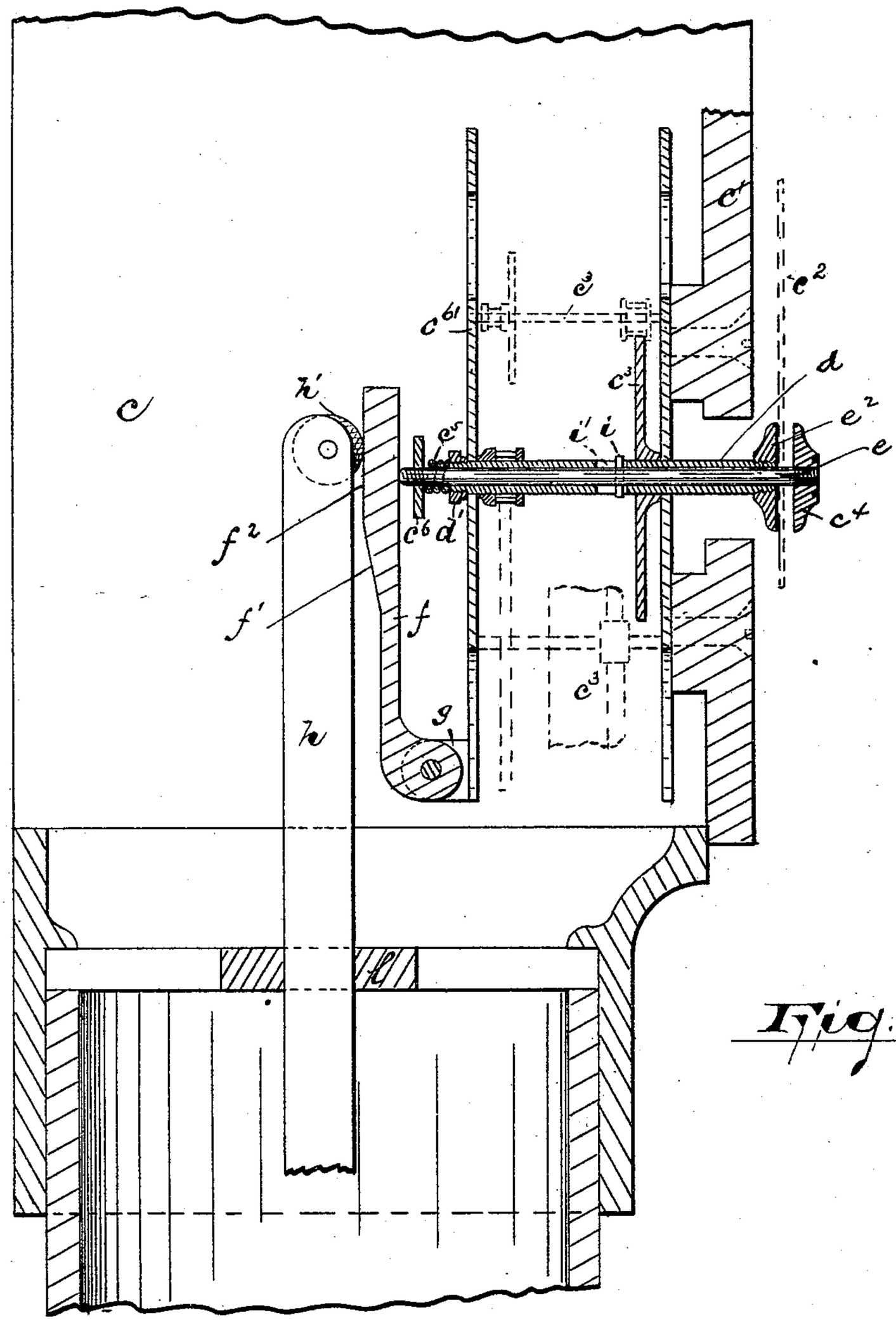

Fig. 8.

WITNESSES: INVENTOR:

Oscar A. Trickel

L. L. Scott

James Wayland,

BY Drake & Cy ATTY'S.

UNITED STATES PATENT OFFICE.

JAMES WAYLAND, OF NEWARK, NEW JERSEY.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 457,175, dated August 4, 1891.

Application filed May 13, 1890. Serial No. 351,689. (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 Combined Semaphore and Time Signaling Systems; 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 of reference marked thereon, which form a part of this specification.

The object of this invention is to show at a single glance to the engineer of a moving railway-train, first, by means of a semaphore or an equivalent signal the fact of the presence or absence of an advance train in the block or section into which the first said train is about to enter, and, second, by means of clock mechanisms the time within certain limits which has elapsed since the passage of the said advance train.

Another object is to enable a train-man in the event of an accident or stoppage to easily and quickly indicate the same from any point in the block or section at the signals stationed at the opposite ends of said block.

The object is, further, to secure the desired results automatically and by means of a simple arrangement of parts and at a reduced cost of construction as compared with the means heretofore employed, and to obtain other advantages and results, such as will be more fully stated in connection with the description of the working parts.

The invention consists in the improved signaling and time-indicating system and devices, and in the arrangements and combinations of parts of the same, substantially as will be hereinafter set forth, and finally embodied in the clauses of the claims.

Referring to the accompanying drawings, in which like letters indicate corresponding parts in each of the several figures, Figure 1 represents a side elevation of a portion of a railway, showing the principal parts of my improved signaling and time-indicating apparatus and system in connection therewith, certain parts thereof being in section. Fig. 2 is a sectional view of the clock-workcase, parts of the time-indicating mechanisms, and certain other parts operating in connection therewith. Fig. 3 is an enlarged sectional detail showing certain mechanism for operating a weight for the semaphore and the rod for operating the time-indicating mechanisms. Figs. 4 and 5 are details of a hand-tool which may be employed by the train-man in operating the signals in the event of an accident. Fig. 6 is an enlarged front view of a standard having a time indicator and semaphore connected therewith, and Fig. 7 is a side view of the same. Fig. 8 is an enlarged sectional detail illustrating a preferred construction for clamping the time-indicating hand or pointer.

In said drawings, *a* indicates the railway-rails, and *b b'* the standards, which are disposed at suitable distances apart at the beginning or end of each "block" or section of the road, as will be understood.

c, Figs. 1, 2, 6, and 7, indicates the time-signal case arranged on the said standards. *c'* is the figured dial, and c^2 is the hand adapted to indicate the number of minutes which have elapsed since the passage of a previous or advance train. Suitable clock mechanisms c^3 are provided within the said case for moving the said hand; but as any of the present or old devices may be employed to secure the desired result, I have not fully illustrated the same, but enough to show the relation of my improvements therewith. The said indicating hand or pointer c^2 is clamped between a main arbor *d* of novel construction, the same being hollow or tubular and revolving in suitable bearings under the influence of the clock mechanisms c^3, and a clamping-rod or male shaft *e*, arranged in and working through said hollow arbor or female shaft *d* and having a collar of head c^4 thereon, between which and the end of the hollow arbor or female shaft or a collar e^2 thereon the hand or pointer c^2 is clamped, as will be understood upon reference to Figs. 2 and 8. Said hand or pointer is arranged loosely on the male shaft *e*, and is adapted to move pivotally to O, Fig. 6, when unclamped, under the influence or power of the weighted end of said hand or pointer, and, when clamped, to revolve with the female shaft controlled by the clock-work, as will be understood. The said clamping-rod *e* is held in engagement with the pointer c^2 by means of a spring c^5, which abuts against the end of the arbor or shaft *d*, or a collar *d'* thereon and a collar c^6, secured upon the end

of the rod or shaft *e*. By compressing the spring c^5 and moving the male shaft longitudinally the pointer is released or unclamped and allowed to automatically turn pivotally to the initial point O. The movement of the rod is limited by a pin *i*, carried by the male shaft and working in a slot *i'* in the female shaft, as shown in Figs. 2 and 8. The said pin prevents independent pivotal movement between the two shafts.

The releasing mechanisms, by means of which the male shaft is moved longitudinally to unclamp the hand or pointer, consists, preferably, of a lever *f*, fulcrumed on an arm *g*, projecting from the frame c^{61} of the clock mechanism or from any other suitable fixture, which said lever bears at its upper end against the end of the male shaft *e*, and at its lower or opposite end is acted on by a rod or bar *h*, extending vertically upward from the lower end of the standard. Said bar *h* may be provided with an anti-friction roller *h'* and the lever *f* may be provided with an incline *f'*, whereby lateral movement is secured, and a straight bearing parallel with the direction of movement of the rod *h*, whereby the said rod *h* may expend its superfluous movement without unduly affecting the clamping mechanisms, as will be understood. The arrangement of the lever may be modified or altered to suit different conditions, and I have shown in Fig. 8 a variation in construction of parts differing from what is shown in Fig. 2.

The rod or bar *h* works in suitable bearings or guides *l*, arranged or formed in said standards in any suitable manner. At its lower extremity the said bar *h* is engaged by a lever *m*, Figs. 1 and 6, arranged on suitable bearings in connection with the track, so that when the train passes thereover the said lever will receive the weight or power of the train and be moved, so that the rod *h* will be forced upward and the hand-clamp will be operated upon to release the hand and the latter will be allowed to drop automatically to zero. The lever *m* may receive the power of the train directly, or it may be arranged so that one end bears on the under side of the rail and extends laterally therefrom to the rod *h* in the standard.

Upon the passage of a train into a block or section the weight of the train in the preferred construction depresses the rail, actuates the lever *m*, and forces the bar *h* upward. The roller on said bar engages the incline *f'* and turns the lever *f* a limited distance. This in turn moves the male shaft *e* longitudinally, so that the collar c^4 no longer bears effectively on the hand or pointer, and the latter turns automatically to an initial point 0, ready, upon again being clamped by the action of the spring c^5 after the passage of the train or after being freed from the action of the train, to be turned pivotally by the action of the clock-work to indicate the time. Immediately after a train has passed the rod *h* is again forced down to its former and normal position by a spring *n*, which abuts against a collar *o* at the end of the rod and a guide-plate *l* at the bottom of the standard.

A pin *p*, Fig. 6, projects from the face of the dial at 0 and at 20 to limit the movement of the pointer; but the stopping of the latter does not cause the clock to stop, as the resistance or friction of the clamp is not great enough to do so. It will be understood that when the pointer has reached 20, or other point desired, it is held stationary until a passing train releases it, as above described.

To avoid accident, such as might happen by the use of a time-signal alone, owing to a train passing into a block or section of the road and stopping, perhaps, at a point concealed from the view of the engineer of a following train owing to a curve in the road or otherwise, the hand of the time-signaling clock in the meantime moving forward and thus misleading the engineer into the understanding that the forward train is still advancing, I have provided a semaphore *r* or other similar visual signal moving in a vertical plane from a position of "safety" to one indicating "danger," which is retained in the danger-indicating position until the train has moved entirely out of the block forward of said signal. This works in connection with the time-signaling apparatus, above described, and is arranged, preferably, on the same standard therewith, so that when the train enters the block and operates the time-signaling apparatus to bring the hand to an initial position it, at the same time and by the employment of some of the same working parts, operates the semaphore of the first signal of said block to bring it to a position indicative of "danger," and at the same time releases the semaphore of the rear block, so that said rear semaphore drops or is moved in the vertical plane to a point indicative of the fact that said train has passed from said rear block, as will be understood. The vertically-movable semaphore indicates by its position in the vertical plane rather than by color the fact of "danger" or "safety." The devices or mechanisms which I prefer to employ to secure the said results automatically are shown in Figs. 1, 3, and 7, in which the semaphore is shown to be controlled by a wire cord or rod *s*, extending therefrom down through the hollow or chamber in the standard to a vertically-movable weight *t*, which slides on or may slide on the rod or bar *h*, as indicated in Fig. 3. The rod or cord (or a chain may be employed) *s* may be and preferably is provided with a spring *u*, arranged or formed somewhere in its length to take therefrom the sudden impact of the dropping weight *t*, by which the said cord may be broken and the device rendered inoperative.

The vertically-sliding weight *t* is thrown upward by a collar or bearing *v* on the rod *h* when the train operates the lever *m*, as described above, and inasmuch as the weight and cord serve to hold the semaphore down

into a position indicative of "safety" when the stress is removed from said cord the semaphore turns upward automatically to a position indicative of "danger." A weight r', Figs. 1 and 6, less heavy than the weight t, serves to give movement to the semaphore and to hold it in the position indicated in Fig. 6, where said semaphore is relieved of the weight t. The weighted end may be provided with a central pane of red glass for use in connection with a lantern or light to be suspended from the hook r^2, Fig. 6, for night-service, as will be understood upon reference to Fig. 6. Thus when a train enters a section the operation thereof on the lever m not only operates the time-signal, but also releases the semaphore, so that it operates automatically to indicate the presence of the train within the said section.

When the weight has been thrown up by the action of the rod h, it is caught and held from drawing the semaphore down by means of a latch or catch a^5, controlled by a spring b^5 or some equivalent device. Said catch connects with a wire or cord c^5, which extends forward to the next standard at the opposite end of the block or section of the road, where it is joined to the vertically-movable rod h thereof, so that when said rod is moved upward by the passing train in the manner heretofore fully described it draws on said cord c^5 and acts on the said latch or catch a^5 against the power of the spring b^5 to remove said catch from holding relation to the weight. Thus as the train passes from the block or section the weight t is released and drops automatically or gravitates, and thus draws on the wire cord s and forces the semaphore to turn to a position which indicates that the said block is clear of obstruction.

The semaphore r preferably is provided with a pulley or a segment thereof, over which the cord is turned, the said cord preferably lying in a groove thereof, as shown in Figs. 1, 6, and 7; but other means of connecting the cord s and semaphore may be employed with advantage to accomplish the desired result. The weight t is provided with an inclined bearing t', Fig. 3, to enable the weight to throw the catch back, so that it will react and enter into holding engagement, as will be understood. The cord c^5, where it joins the vertical rod or bar h, preferably passes over a pulley or sheave d^5 to secure a more easy movement.

To enable a train-man to quickly and easily bring the semaphores into a position of "danger" should a train stop or an accidental break occur in the block or section, I have provided means to enable the train-men to operate the semaphores, so that there will be no danger of a second train entering the block at either end. Said means consist, preferably, of levers l^5 l^5, fulcrumed, as at m^5, on the standards and connected at their upper ends by a wire o^5, which extends from one end of the section or block to the other, so that the train-man can at any point in said section by means of a suitable tool—such, for example, as the one shown in Figs. 4 and 5—bend or twist the wire, so that it is shortened in length and the levers moved pivotally, so that the weight is raised and the semaphores allowed to drop to a position indicative of "danger," as will be understood.

I am aware that various modifications and variations may be made in the construction of the device other than those particularly referred to, and I do not wish to be understood as limiting myself to the specific mechanisms positively referred to.

The description of the working of the parts of the machine and the machine as a whole has been already sufficiently ample to enable a full understanding of the working of the device, and a further statement at this point is deemed to be unnecessary.

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

1. In a railway signaling system, the combination, with a semaphore r, having a weight r', adapted to overbalance the signaling end thereof and force the latter to a position indicative of "danger," and a cord s, having a weight t thereon free to gravitate when released and to draw the said signaling end to a position indicative of "safety," a clock, a rod extending to said clock and controlling the operation of the same and adapted to raise said weight t and allow the weight r' to operate the semaphore, and a lever adapted to be operated upon by the passing train and operating said rod, substantially as and for the purposes set forth.

2. In a railway signaling system, the combination, with a clock and a semaphore, of two weights, one of which holds the semaphore in a position indicative of "danger" and the second of which overbalances the first and draws the said semaphore into a position indicative of "safety," a rod adapted to operate the clock mechanism and to raise the second said weight, a catch to hold the said second weight, and a lever arranged to receive movement from the passing train, substantially as set forth.

3. In a railway-signal, a standard having a vertically-movable semaphore and a clock, a wire or cord s, and a vertically-movable rod having a bearing v, and a weight t, which forces said semaphore into its position indicative of "safety," substantially as set forth, and means for moving said rod vertically, substantially as set forth.

4. In a railway-signal, a standard, a weighted semaphore adapted to move automatically to a position indicative of "danger," and a heavier weight secured to said semaphore and adapted to move the same to a position of "safety," a clock, and means for operating said clock and raising said heavier weight simultaneously, substantially as set forth.

5. In a railway-signal, the combination of the weighted semaphore, cord s, movable

weight *t*, a clock and rod for operating the same, and means adapted to connect with the railway to give movement to said weight *t* and rod and relieve the semaphore and allow it to move automatically, substantially as set forth.

6. In a railway signaling system, the combination, with a clock and a semaphore, a weight to draw said semaphore to a position indicative of "safety," a rod adapted to raise said weight and operate the clock mechanisms, a catch to hold said weight in an elevated position during the period of danger, and means for operating said rod under the influence of the passing train, substantially as set forth.

7. In a railway-signal, the combination of the vertically-movable semaphore, wire *s*, spring *u*, weight *t*, and a clock, and means for raising said weight *t* and operating said clock simultaneously, substantially as set forth.

8. In a railway-signal, the combination of the semaphore having sheave d^5, a cord or equivalent connection *s*, a weight *t*, a clock, a rod having a bearing to raise said weight, and means, substantially as described, for releasing the hand of said clock simultaneously with the raising of said weight, substantially as and for the purposes set forth.

9. In a railway-signal, the combination, with the standard, and time-indicating means, and semaphore, of the rod *h*, adapted to operate said time-indicating means and having a bearing *v*, a weight sliding on said rod *h* and connected with said semaphore, and means for operating said rod *h*, substantially as and for the purposes set forth.

10. In a time-indicating signal, the combination of the clock mechanism having a female shaft or arbor *d*, a male shaft *e*, having a head e^4 to form a clamp with the end of said female shaft, a hand or pointer, a spring c^5, a lever *f*, having an incline *f'* and a parallel and straight bearing f^2, and a vertically-movable rod *h*, adapted to be operated by the action of the moving train, substantially as set forth.

11. In a time-indicating signal, the combination, with the slotted female shaft *d*, a male shaft, and pin or key to prevent independent pivotal movement, the said male and female shafts providing means for clamping the hand or pointer, substantially as set forth.

12. The combination, with standards arranged apart and having semaphores and clocks arranged thereon, and means for operating the same, of a wire or like connection extending from one standard to the other and adapted to be bent or contracted, as described, and thus to operate the semaphores without affecting the clock to indicate "danger," substantially as set forth.

13. In combination with standards *b*, clocks *c*, semaphores *r*, wires *s*, weights *t*, levers *m*, levers l^5, and wire or similar connection o^5, adapted to raise said weight without affecting the clock-movement, all arranged and adapted to operate, substantially as and for the purpose set forth.

14. In a time-signal, the combination, with the clock and mechanism for operating the same, a semaphore *r*, and weight *t* for holding the same in a position indicative of "safety," of a wire or like connection and a lever for raising said weight when stress is brought on said wire, substantially as and for the purposes set forth.

15. In a time-signal, the combination, with a clock and means for operating the same, a semaphore and weight for holding the same in a position indicative of "safety," means, as described, for raising said weight and releasing the semaphore from the weight thereof, and a wire or its equivalent extending from said means for raising said weight, whereby the train-man can at any point in the block or section operate said means, substantially as set forth.

16. In combination with a standard *b*, semaphore *r*, wire *s*, weight *t*, latch a^5, spring b^5, cord c^5, sheave a^5, rod *h*, and lever *m*, all said parts being arranged and adapted to operate substantially as and for the purposes set forth.

17. In a time-signaling system, the combination, with standards *b b'*, a clock, a semaphore *r*, weights *t*, connected thereto and sliding on rod *h*, having bearing *v*, latch a^5, spring b^5, cord c^5, connected with bar *h*, of standard *b'*, and means *m* for operating said bar *h*, substantially as and for the purposes set forth.

18. In a railway time-signal system, the combination, with clocks and semaphores arranged on standards arranged at suitable distances apart, of wires and co-operating mechanisms connecting the semaphore, whereby as the train leaves a block or section the same will operate said wire and the semaphore at the rear of said section to indicate the fact of such leaving, substantially as and for the purposes set forth.

19. In a railway time-signal system, the combination, with the clocks and the semaphores thereof, and means for changing the semaphore from the position indicative of "safety" to a position indicative of "danger," of a wire or similar connection extending from one semaphore to the other and adapted to operate the said means for changing the said semaphores from said position indicative of "safety" to that indicative of "danger," whereby a train-man may conveniently, in the event of an accident, immediately operate the semaphore or semaphores to indicate the same, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 6th day of March, 1890.

JAMES WAYLAND.

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