(No Model.) 2 Sheets—Sheet 1.

C. M. CLINTON.

RAILWAY TIME SIGNAL.

No. 357,065. Patented Feb. 1, 1887.

Fig. 1.

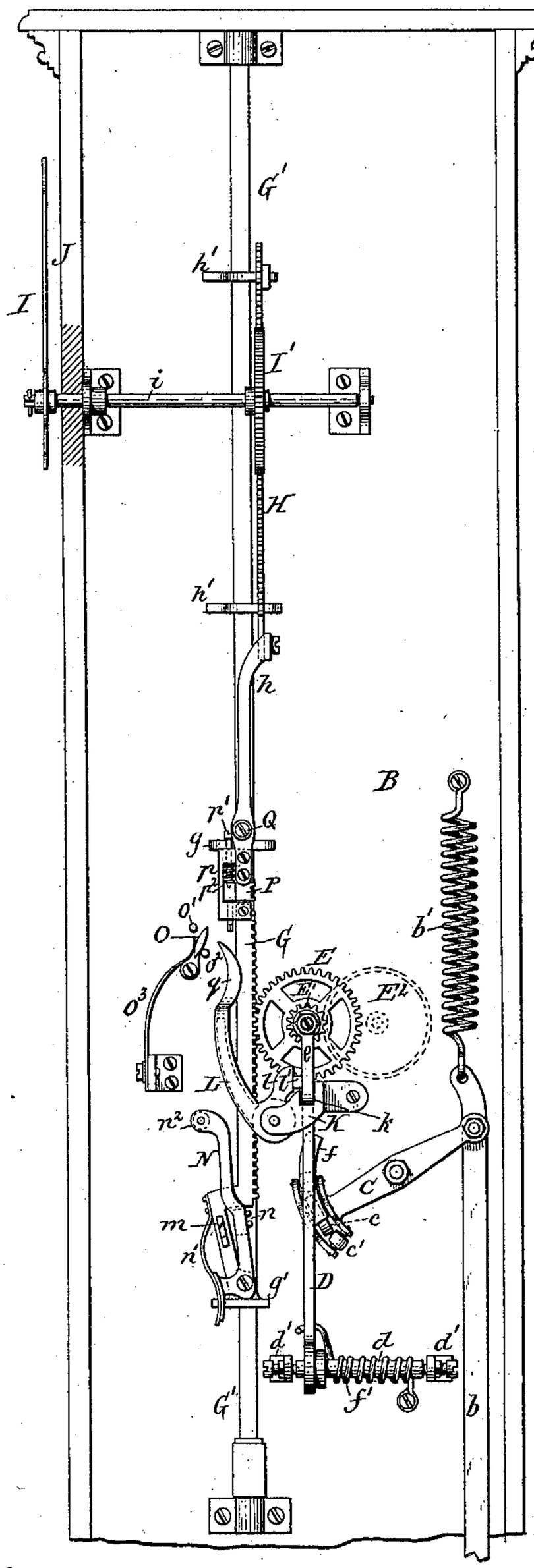


Fig. 2.

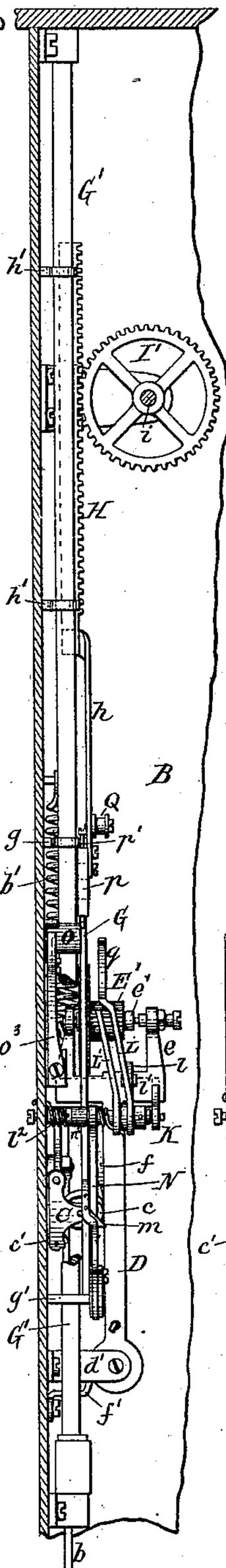


Fig. 5.

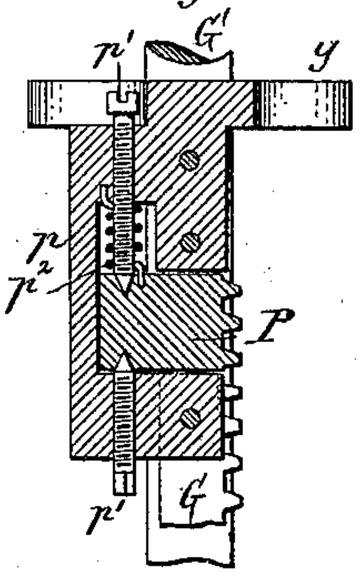


Fig. 6.

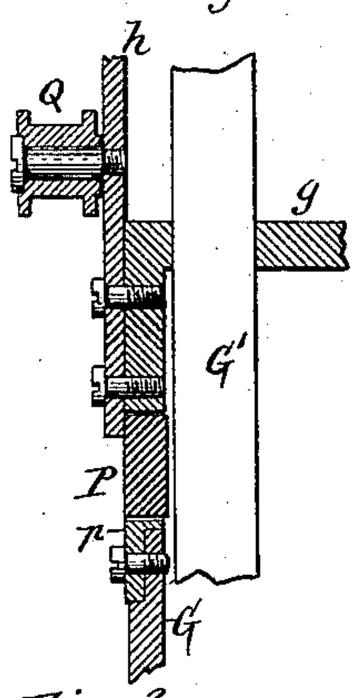


Fig. 3.

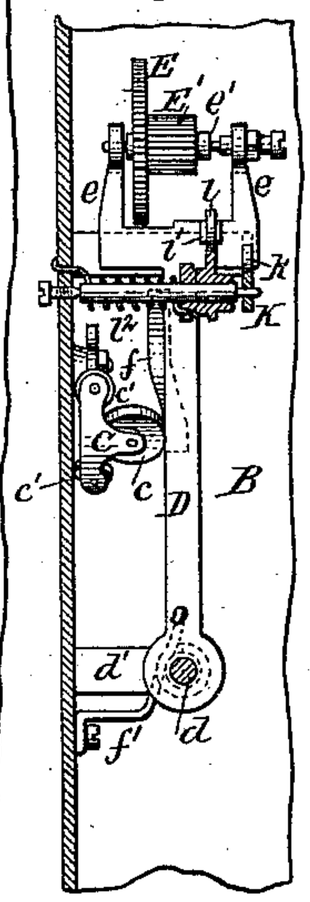
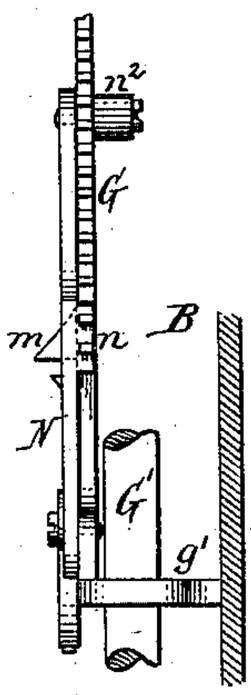


Fig. 4.



Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

C. M. CLINTON.

RAILWAY TIME SIGNAL.

No. 357,065. Patented Feb. 1, 1887.

Fig. 7.

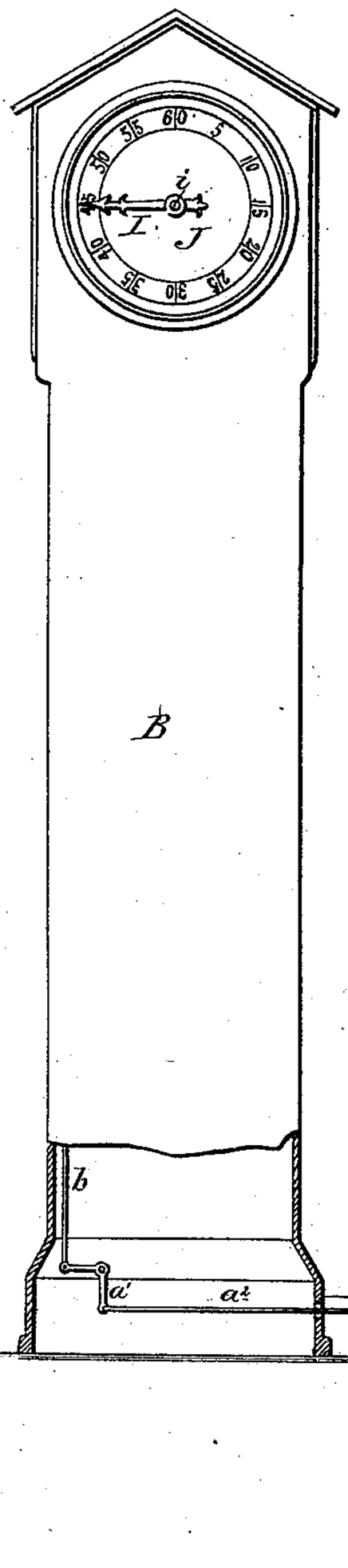


Fig. 8.

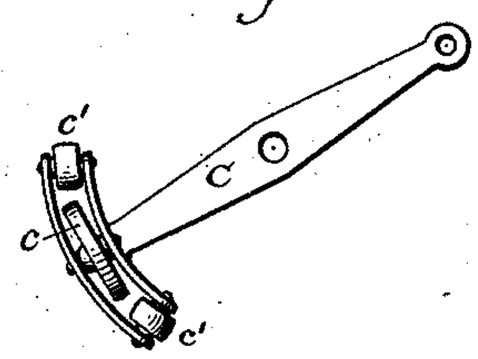


Fig. 9.

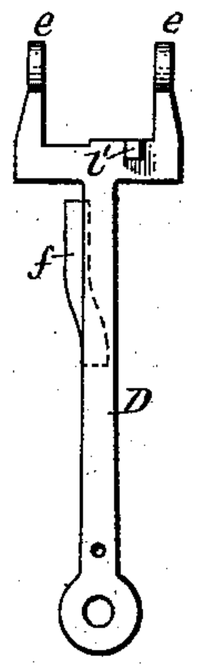


Fig. 10.

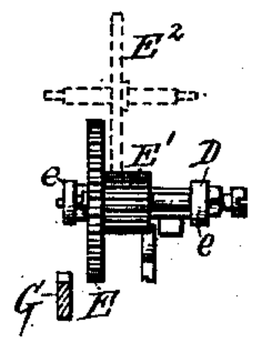


Fig. 11.

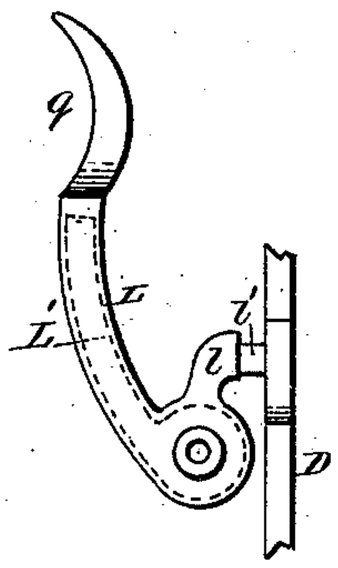


Fig. 12.

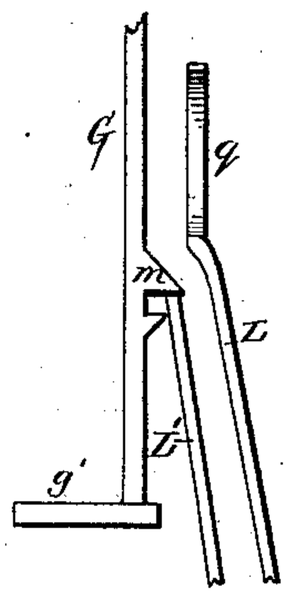
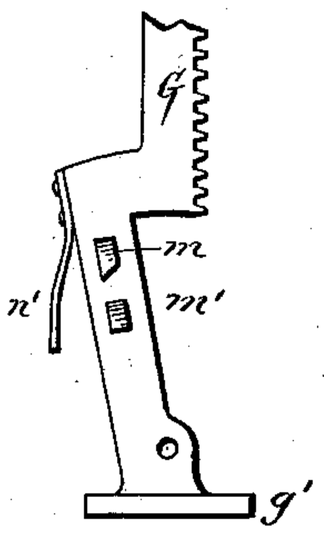


Fig. 13.



Witnesses.
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By Wilhelm & Bonner.
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES M. CLINTON, OF ITHACA, ASSIGNOR TO CHRISTOPHER C. BRADLEY, OF SYRACUSE, NEW YORK.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 357,065, dated February 1, 1887.

Application filed April 9, 1886. Serial No. 198,336. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. CLINTON, of Ithaca, in the county of Tompkins and State of New York, have invented new and useful Improvements in Railway Time-Signals, of which the following is a specification.

This invention relates to that class of railway time-signals which indicate automatically the period of time which has lapsed since the last train passed a given point, and in which a pointer is turned by clock-work and stopped at the end of a certain maximum period of time, which pointer is automatically turned back to the starting-point by a passing train and then moved forwardly by the clock mechanism, so that the distance of the pointer from the starting-point will indicate at a glance the period of time which has lapsed since the passage of the last train.

The object of my invention is the construction of a time-signal of this character which shall be reliable in its operation and simple and durable in construction; and my invention consists to that end of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a side elevation of the signal mechanism. Fig. 2 is a front elevation of the same. Fig. 3 is a front elevation of the movable wheel-support and connecting parts. Fig. 4 is a rear elevation of the movable teeth at the lower end of the rack-bar. Fig. 5 is a vertical longitudinal section of the movable teeth at the upper end of the rack-bar on an enlarged scale. Fig. 6 is a vertical transverse section of the movable teeth and connecting parts at the upper end of the rack-bar on an enlarged scale. Fig. 7 is a sectional elevation of the time-signal. Fig. 8 is a side elevation of the lever connecting the pull-rod with the yoke. Fig. 9 is a front elevation of the yoke. Fig. 10 is a top plan view of the same. Fig. 11 is a side elevation of the lever which supports the rack-bar. Fig. 12 is a front elevation of the same. Fig. 13 is a side elevation of the lower portion of the rack-bar.

Like letters of reference refer to like parts in the several figures.

A represents the movable rail, which is slightly deflected by the train or engine passing over it, and which operates the signal by bell-cranks a a' and rods a^2, or other suitable connecting devices.

b represents the pull-rod, which extends upwardly through a suitable casing, B, to the signal mechanism. The upper end of the pull-rod b is connected with the casing B by a spring, b', which raises the pull-rod after it has been drawn down by depressing the rail A.

C represents a lever, which is pivoted to the casing B or some other support and which is connected at one end with the upper portion of the pull-rod b, and which carries at its opposite end a large actuating-roller, c, and small anti-friction rollers c'. The latter bear against the case B, and facilitate the movement of the lever C.

D represents a swinging bifurcated arm or yoke, which is secured to a shaft, d, pivoted in bearings d', and which is provided at its upper end with two bearings, e, in which is journaled a shaft, e', carrying a gear-wheel, E, and pinion E'. The latter meshes with a gear-wheel, E^2, indicated by dotted lines in Figs. 1 and 10, and constituting the last wheel of the clock movement or train. The clock mechanism is not shown in the drawings, and may be of any ordinary or suitable construction, the wheel E^2 being preferably so proportioned that it causes the pinion E' and wheel E to make one revolution per hour. The yoke D is capable of swinging sidewise on its pivots in a direction at right angles to the planes of the wheels E E^2; but the pinion E' is made so long that it remains in gear with the wheel E^2 of the clock mechanism in all positions of the yoke D, so that the wheel E and pinion E' are continuously rotated by the clock mechanism.

f represents a curved or inclined cam, secured to one side of the yoke D and engaging against the roller c of the lever C, so that when the latter is swung on its pivot by pulling the rod b down the roller c will cause the yoke D to be swung on its pivots. The yoke D is returned to its normal position by a spring, f', when the pull-rod b is released.

G represents an upright rack-bar, which is

guided near its upper and lower ends by loops *g g'* on a vertical bar, G', and which meshes with the gear-wheel E when the yoke D is in its normal position, as shown in Figs. 2 and 3, so that in this position of the parts the rotation of the wheel E causes the rack-bar G to move upwardly. Upon swinging the yoke D sidewise by pulling on the rod *b*, as above described, the wheel E is disengaged from the rack-bar G.

H represents an auxiliary rack-bar, arranged at right angles to the rack-bar G and secured thereto at its upper end by an arm, *h*. The bar H is provided with loops *h'*, which guide it on the bar G'.

i represents the horizontal pointer-shaft, provided with a pointer, I, and with a gear-wheel, I, which meshes with the rack-bar H, so that the vertical movement of the rack-bar H turns the pointer I back and forth on the dial J. The latter is graduated from zero to the number of minutes which are regarded as the maximum period of time which it is necessary to indicate by the signal, forty-five minutes being shown in the drawings.

K represents a bearing, which is secured to the case B and which embraces the upper portion of the yoke D and limits the outward movement of the yoke. The bearing K is provided with a notch, *k*, in which the upper portion of the yoke is guided, as represented in Figs. 1 and 3.

L is a lever, which is pivoted to the bearing K and provided with a short arm, *l*, which bears against a stud, *l'*, formed on the front side of the yoke D. The stud or projection *l'* is so arranged on the yoke that the short arm *l* bears against the stud, and the latter holds the lever L in position when the wheel E meshes with the rack-bar G. The lever L is arranged on one side of the rack-bar G and extends upwardly along the same.

l² represents a spring, which is coiled around the shaft of the lever L and which holds the short arm of said lever against the yoke.

L' represents a spring-arm, which is secured to the lever L between the latter and the rack-bar G.

m represents a nose formed on the lower portion of the rack-bar G, so as to project laterally therefrom and come in contact with the spring-arm L' when the rack-bar is raised. The upper side of the nose *m* is inclined, so as to force the spring-arm L' out of its way as the rack-bar moves upwardly, and the lower side of the nose is made abrupt, so that it will rest upon the end of the spring-bar L' and support the rack-bar when the latter has been elevated, as represented in Fig. 12. The lower portion of the rack-bar G is bent forwardly, so as to form on its rear side a recess, *m'*, and the nose *m* is formed on the forwardly-bent portion of the rack-bar in front of the recess *m'*, as represented in Fig. 13.

N represents an arm, which is pivoted to the lower end of the rack-bar G, on one side thereof, and which is provided with teeth *n*, which are arranged in the recess *m'*, and which can be placed in line with the rack-bar by turning the arm N backwardly on its pivot. The arm N is held by a spring, *n'*, in the position indicated in Fig. 1, in which the teeth *n* are located in front of the teeth of the rack-bar. The upper end of the rack-bar N is provided with a roller, *n²*.

O represents a movable cam, which is pivoted to the case B, on the front side of the rack-bar G, in such a position that the roller *n²* of the arm N can come in contact with the same. The movement of the cam O is limited by a front stop, O', and a rear stop, O², and the cam is held against the rear stop by a spring, O³.

P represents a movable toothed section, forming the upper end of the rack-bar G and pivoted in a frame, *p*, which is secured to the upper end of the rack-bar. The pivots are formed by vertical screws *p'*, on which the section P can turn laterally or horizontally. The section P is held yieldingly in line with the rack-bar by a spring, *p²*, which is coiled around one of the pivot-screws and secured with its ends to the section P and the frame *p*, as represented in Fig. 5. The spring returns the section P to its position in line with the rack-bar when the cause which has turned the section out of line with the rack-bar has been removed.

Q represents a stud or roller secured to one side of the rack-bar G, near the upper end thereof, and adapted to come in contact with the upper curved end, *q*, of the lever L when the rack-bar descends, so as to swing the lever L forwardly on its pivot. As shown in the drawings, the roller Q is secured to the arm *h*, which forms an upward continuation of the rack-bar.

The operation of the signal mechanism is as follows: In the position of the parts represented in Figs. 1, 2, and 3 the signal mechanism has been set in motion by depressing the pull-rod *b*, and the gear-wheel E is in engagement with the rack-bar G and moves the latter upwardly, which movement, being communicated to the pointer-shaft *i* by the rack-bar H and gear-wheel I', causes the pointer I to traverse the dial J from the zero-point toward the last mark of the graduation, being 45 in the drawings. Assuming, now, that a train or locomotive approached the indicator, the engineer can determine by observing the position of the pointer how many minutes ago the last train passed this point. In passing over the movable rail A the first wheel depresses the rail, whereby the rod *b* is pulled down and the lever C swung on its pivot in such manner that the roller *c* of the lever C engages with the cam *f*, whereby the yoke D is swung laterally, so as to disengage the wheel E from the rack-bar G. This lateral motion of the upper part of the yoke D removes the stud *l'* of the yoke from the short arm *l* of the lever L and causes the arm *l* to bear against the front side of the yoke D on the inner side

of the stud, as represented in Fig. 10, whereby the yoke is prevented from swinging back under the influence of the spring *f'*. The rack-bar being so released from the wheel E, descends by gravity, whereby the pointer is turned back to the zero-point. When the rack-bar has nearly reached its lowest position, the roller Q strikes the curved end *q* of the lever L and swings the latter forwardly, causing the short arm *l* to release the stud *l'*. This permits the yoke D to return to its normal position under the pressure of the spring *f'*, and causes the wheel E to engage again with the upper portion of the rack-bar G. This upper portion is formed by the laterally-movable section P, which yields sidewise when the teeth of the wheel E and those of the section P do not properly interlock. The teeth of the gear-wheel E are by this means enabled to engage with the teeth at the upper end of the rack-bar during the short up and down movements produced in the rack-bar by a number of wheels passing successively over the movable rail. The wheel E being again in engagement with the rack-bar, the latter is moved upwardly and the pointer is again turned, as above described. If this upward movement of the rack-bar is not interrupted by a passing train, but continues to its upward limit, the roller n^2 strikes against the rear side of the cam O, whereby the arm N is swung backwardly, so as to bring the movable teeth *n* in line with the rack-bar G. The roller n^2 clears the upper end of the cam O when the wheel E is in engagement with the movable teeth *n*, thereby permitting the arm N to swing forwardly under the pressure of the spring *n'*. This movement of the arm N disengages the teeth *n* from the wheel E, and permits said wheel to rotate freely under the action of the clock-work. When the teeth *n* are disengaged from the wheel E, the nose *m* has passed beyond the upper end of the spring-arm L' and supports the rack-bar G upon the end of the spring L'. The rack-bar remains stationary in this position and holds the pointer at the limit of its forward movement, which is indicated by the figure 45 in the drawings. When the pull-rod *b* is actuated by the next train which passes the signal, the spring-arm L' is withdrawn from under the nose *m* by the backward movement of the lever L, which takes place when the yoke D is swung sidewise by the lever C. The rack-bar now descends by gravity and returns the pointer to the starting-point. The roller n^2 of the arm N engages against the front side of the cam O during the downward movement of the rack-bar, whereby the movable teeth are prevented from being placed in line with the teeth of the rack-bar during the downward movement of the latter.

I claim as my invention—

1. The combination, with the pointer and the gear mechanism by which it is rotated, of the gear-wheel E, which is continuously rotated by a clock-train, and a movable support in which the wheel E is mounted, and whereby said wheel is thrown in and out of engagement with the pointer-gear, substantially as set forth.

2. The combination, with the continuously-rotating gear-wheel E and its movable support, of a pointer-gear mechanism, substantially as described, whereby the pointer is rotated from the wheel E, a releasing device whereby the pointer-gear is disconnected at the end of its movement from the gear-wheel E, and a catch whereby the pointer is held at the end of its movement, substantially as set forth.

3. The combination, with the continuously-rotating gear-wheel E and its movable support, of a pointer, a gear-rack, G, whereby the pointer is rotated from the wheel E, a releasing device, N, whereby the gear-rack is disconnected from the wheel E at the end of its movement, and a catch whereby the gear-rack is supported when disengaged from the wheel E, substantially as set forth.

4. The combination, with the rack-bar G, of the movable support D, a gear-wheel, E, and pinion E', mounted in said support, a pull-rod, *b*, and a lever, C, which transmits the motion of the pull-rod to the movable support D, substantially as set forth.

5. The combination, with the rack-bar G, of the movable support D, provided with a cam, *f*, the wheel E, and pinion E', mounted in said support, a lever, C, provided with an actuating-roller, *c*, and the pull-rod *b*, attached to said lever, substantially as set forth.

6. The combination, with the rack-bar G, provided with a nose, *m*, of a movable wheel-support, D, provided with a projection, *l'*, a pivoted lever, L, provided with a short arm, *l*, adapted to rest against the projection *l'*, and a spring-arm, L', adapted to support the nose *m*, substantially as set forth.

7. The combination, with the rack-bar G, provided with a nose, *m*, and roller Q, of a movable wheel-support, D, provided with a projection, *l'*, a lever, L, adapted to be moved by the roller Q and having a short arm, *l*, resting against the projection *l'*, and a spring-arm, L', secured to the lever L and adapted to support the nose *m*, substantially as set forth.

8. The combination, with a wheel, E, of the rack-bar G, provided at its lower end with a movable arm, N, having teeth *n*, substantially as set forth.

9. The combination, with the wheel E, of the rack-bar G, provided with a movable arm, N, having teeth *n*, and a cam, O, whereby the arm N is moved to bring the teeth *n* in line with the rack-bar, substantially as set forth.

10. The combination, with the continuously-rotating wheel E, of the rack-bar G, provided with movable teeth *n*, whereby the rack-bar is disengaged from the wheel E, substantially as set forth.

11. The combination, with the wheel E, of

the rack-bar G, provided with a laterally-movable toothed section, P, substantially as set forth.

12. The combination, with the rack-bar G, of the toothed section P, vertical pivots p', on which said section swings, and a spring, p^2, which holds said section in line with the rack-bar, substantially as set forth.

13. The combination, with the continuously-rotating wheel E and its movable support D, of the rack-bar G, engaging with the wheel E, a rack-bar, H, secured to the rack-bar G, a pointer, I, and shaft *i*, and a wheel, I', secured to the shaft *i* and engaging with the rack-bar H, substantially as set forth.

Witness my hand this 29th day of March, 1886.

CHARLES M. CLINTON.

Witnesses:
B. R. WILLIAMS,
P. J. STATENHERM.