(No Model.) 4 Sheets—Sheet 1.

W. H. SAYLES.

RAILWAY TIME SIGNAL.

No. 441,981. Patented Dec. 2. 1890.

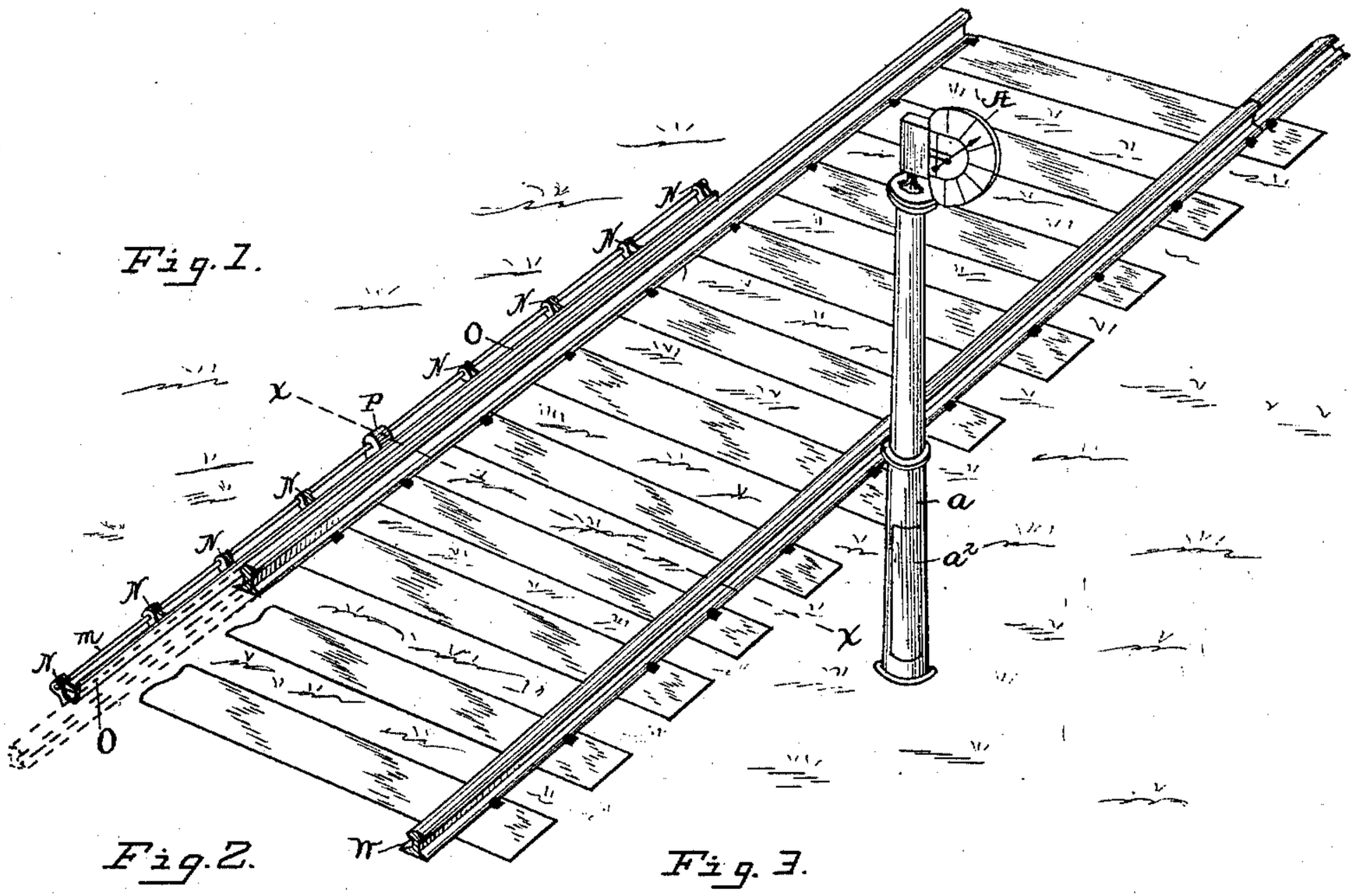


Fig. 1.

Fig. 2.

Fig. 3.

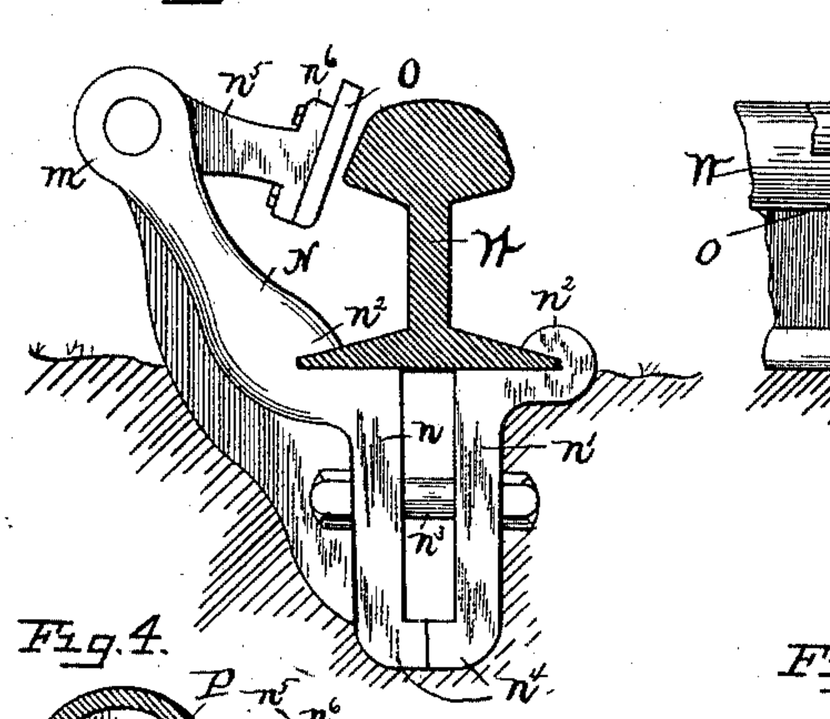


Fig. 4.

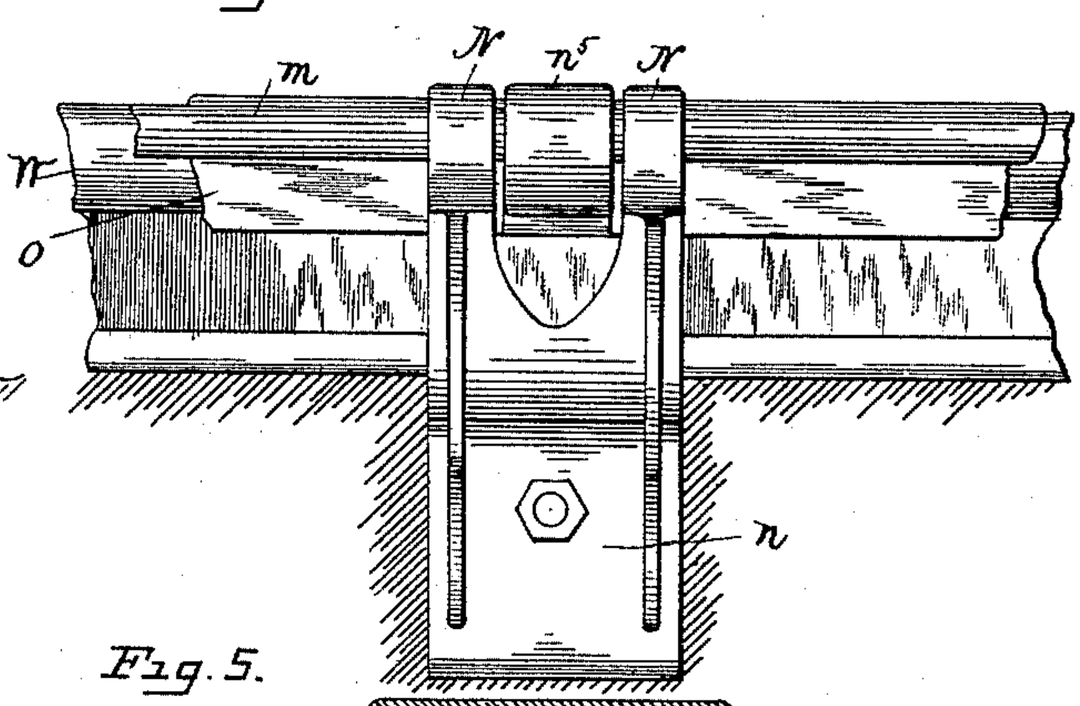
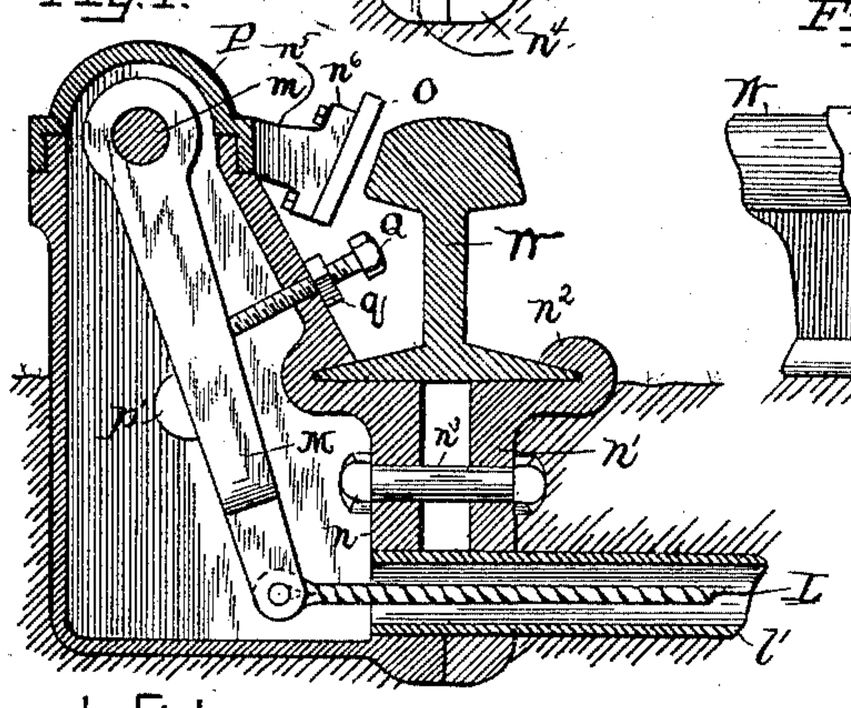
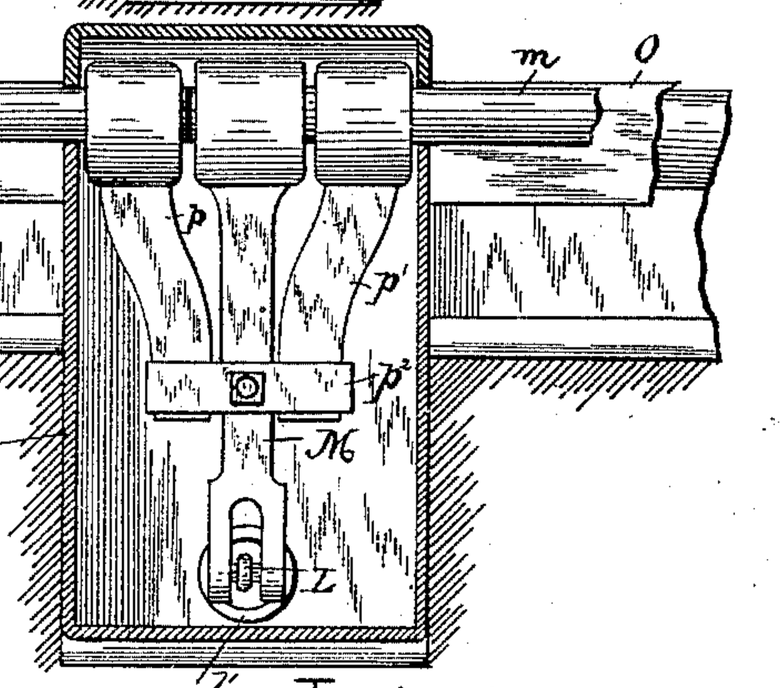


Fig. 5.



Witnesses
Wm. S. Hodges
D. A. Millick.



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(No Model.) 4 Sheets—Sheet 2.

W. H. SAYLES.

RAILWAY TIME SIGNAL.

No. 441,981. Patented Dec. 2, 1890.

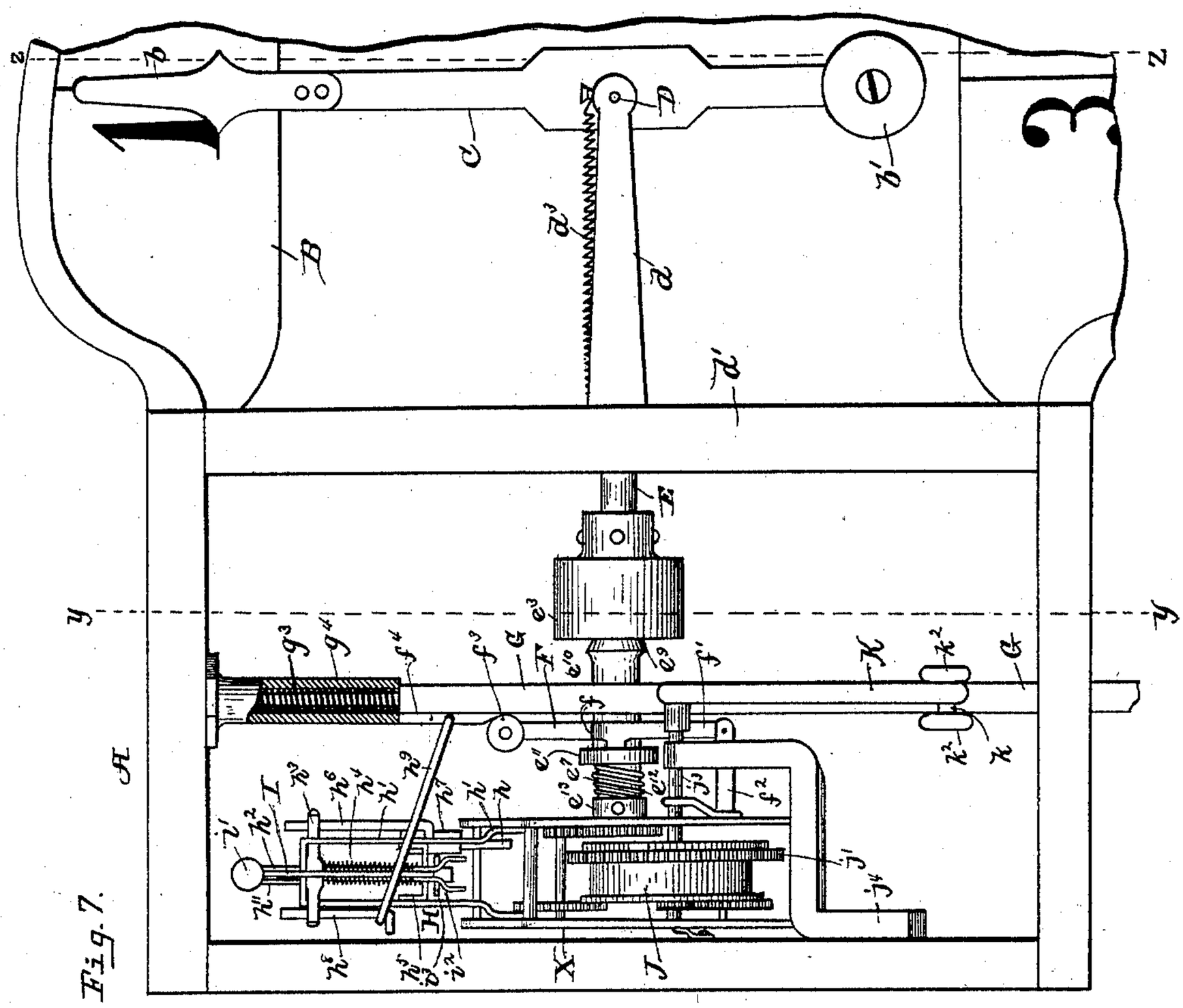

Fig. 7.

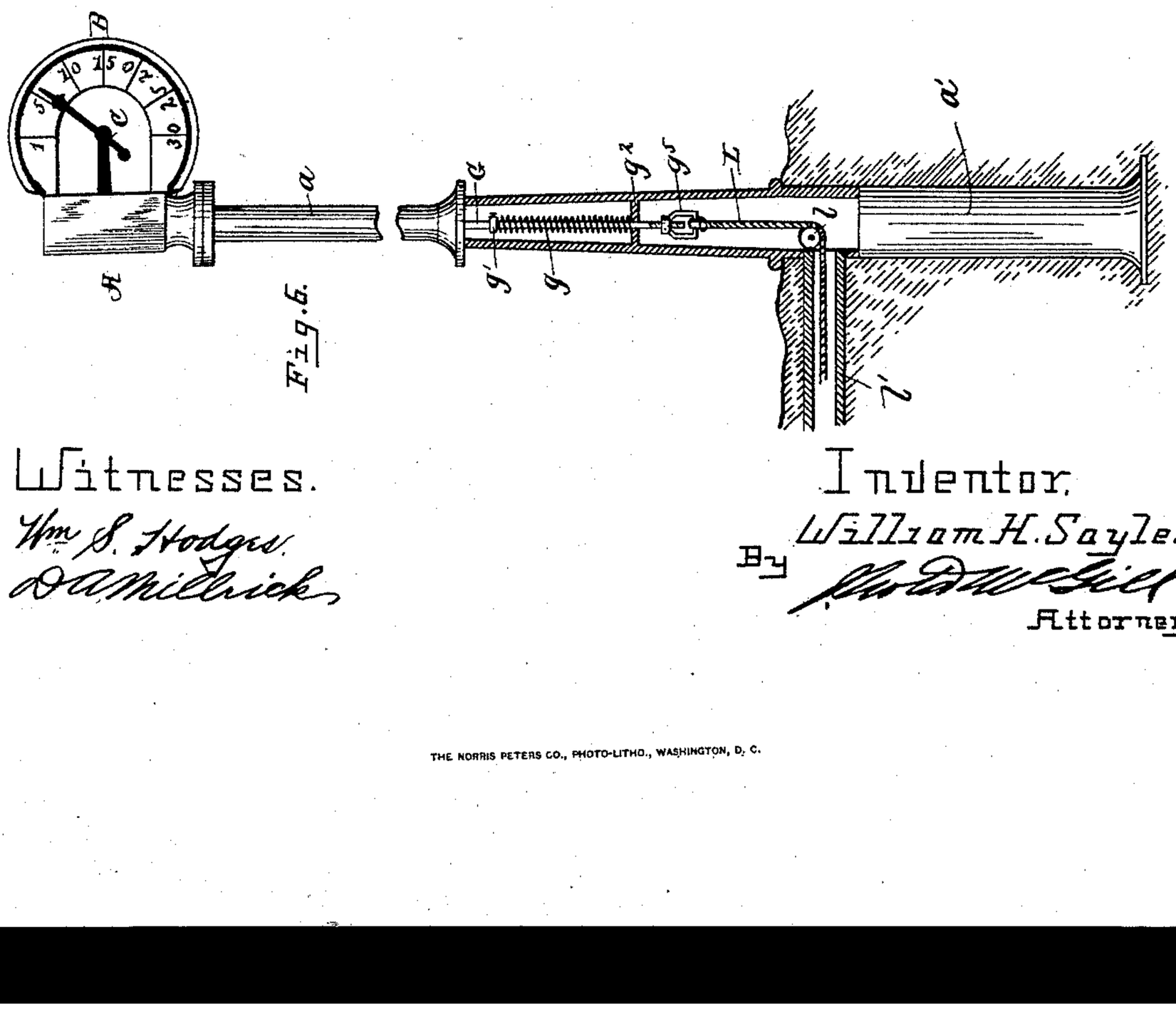

Fig. 6.

Witnesses.

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Attorney

(No Model.) 4 Sheets—Sheet 3.

W. H. SAYLES.

RAILWAY TIME SIGNAL.

No. 441,981. Patented Dec. 2, 1890.

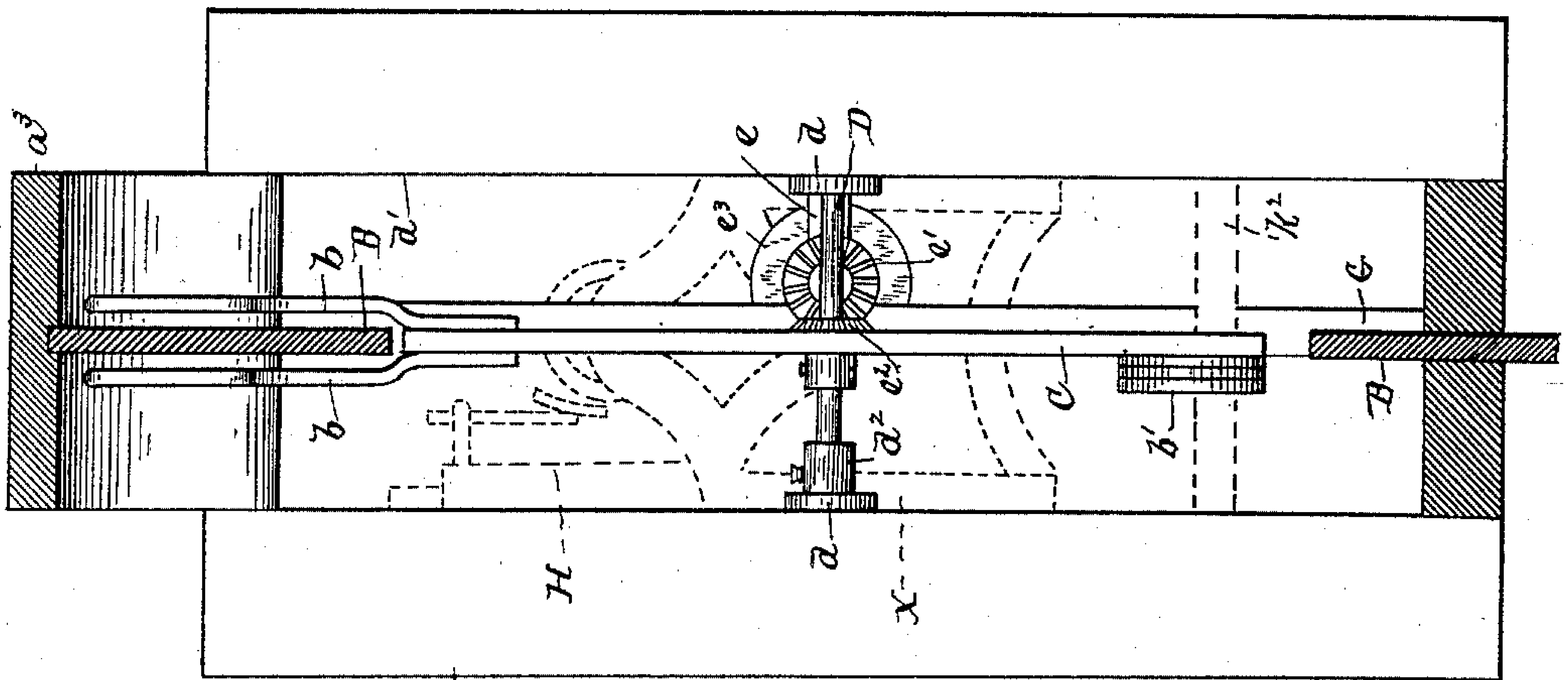

Fig. 10.

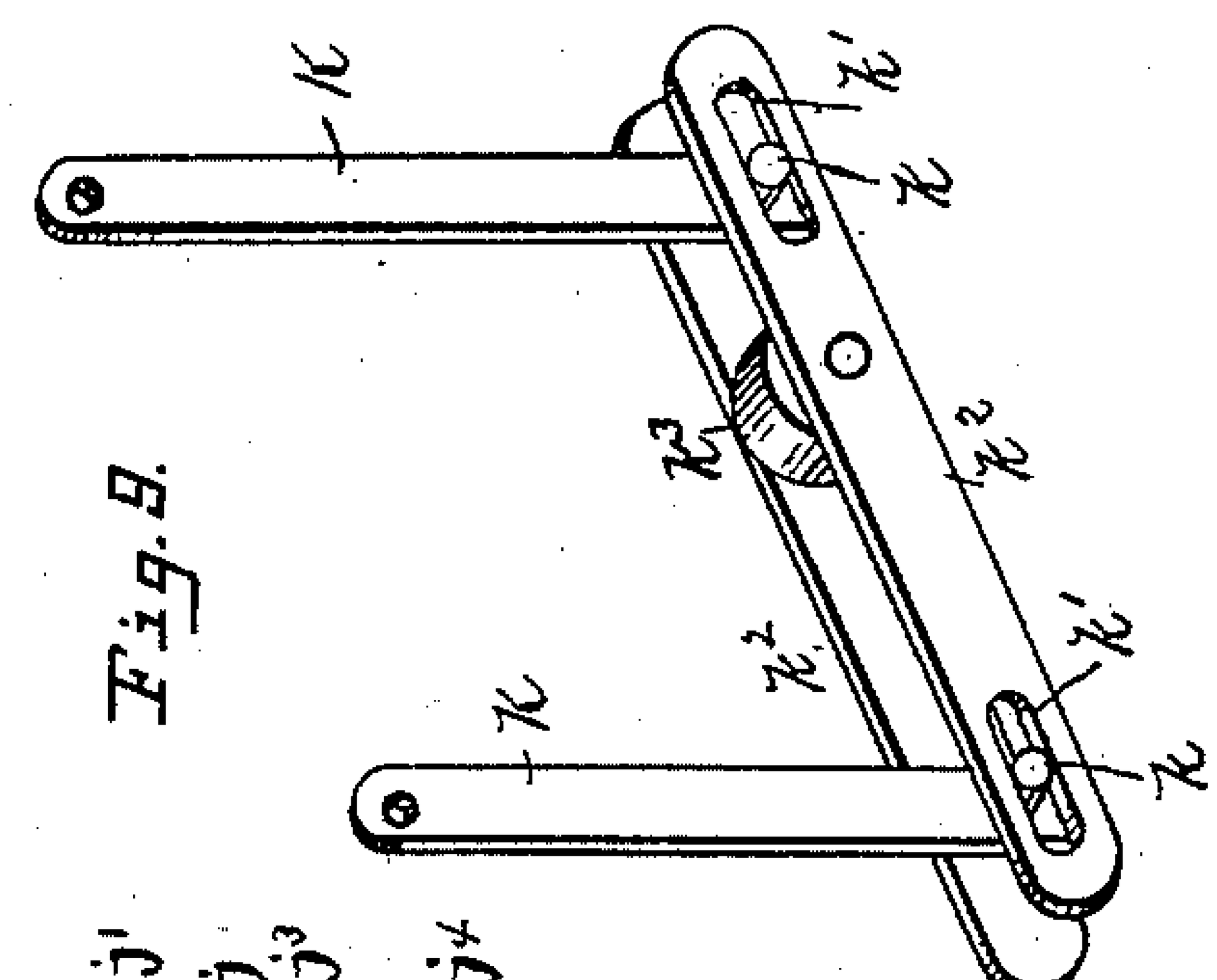

Fig. 9.

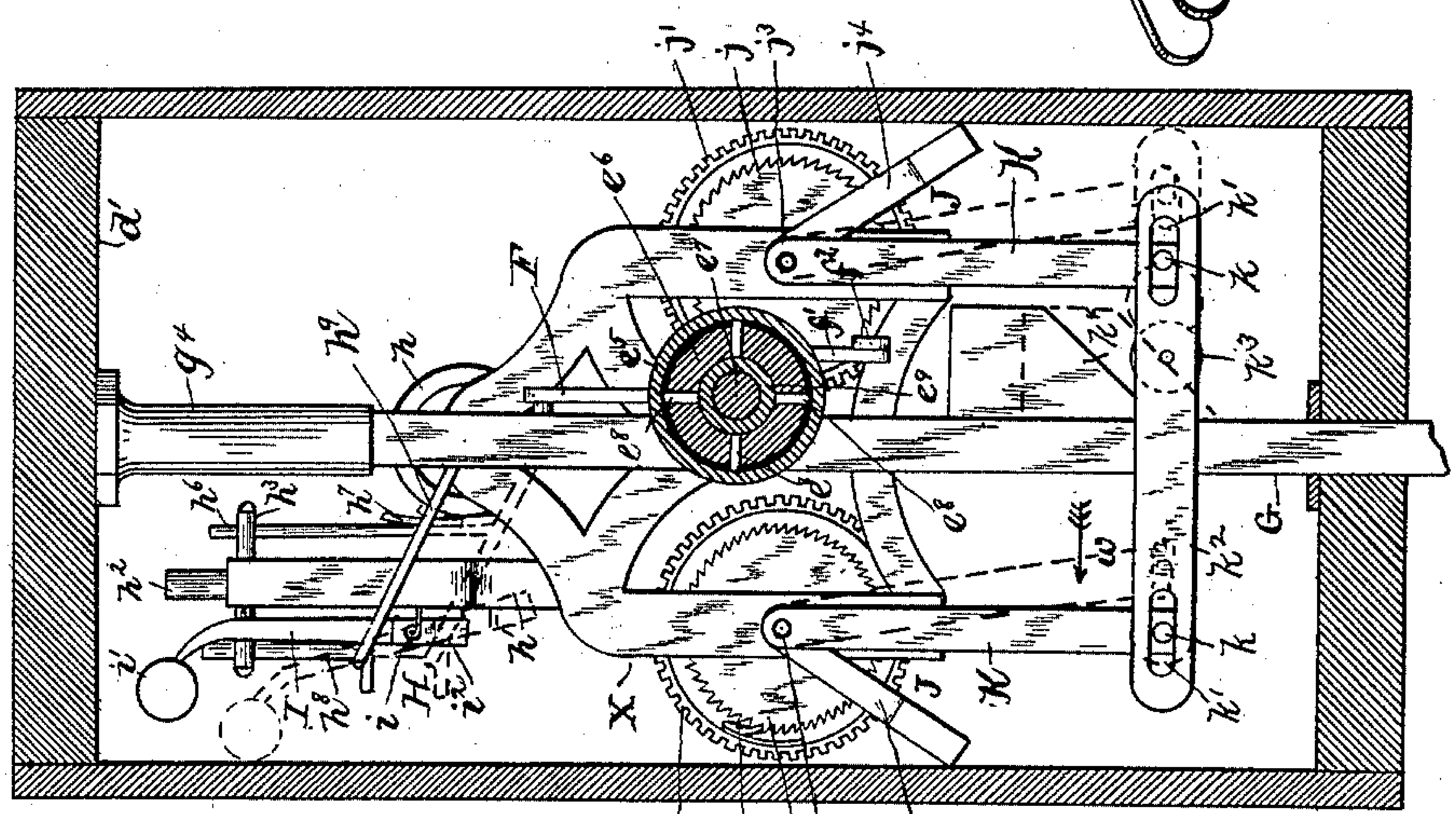

Fig. 8.

Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 4.

W. H. SAYLES.

RAILWAY TIME SIGNAL.

No. 441,981. Patented Dec. 2, 1890.

Fig. 11.

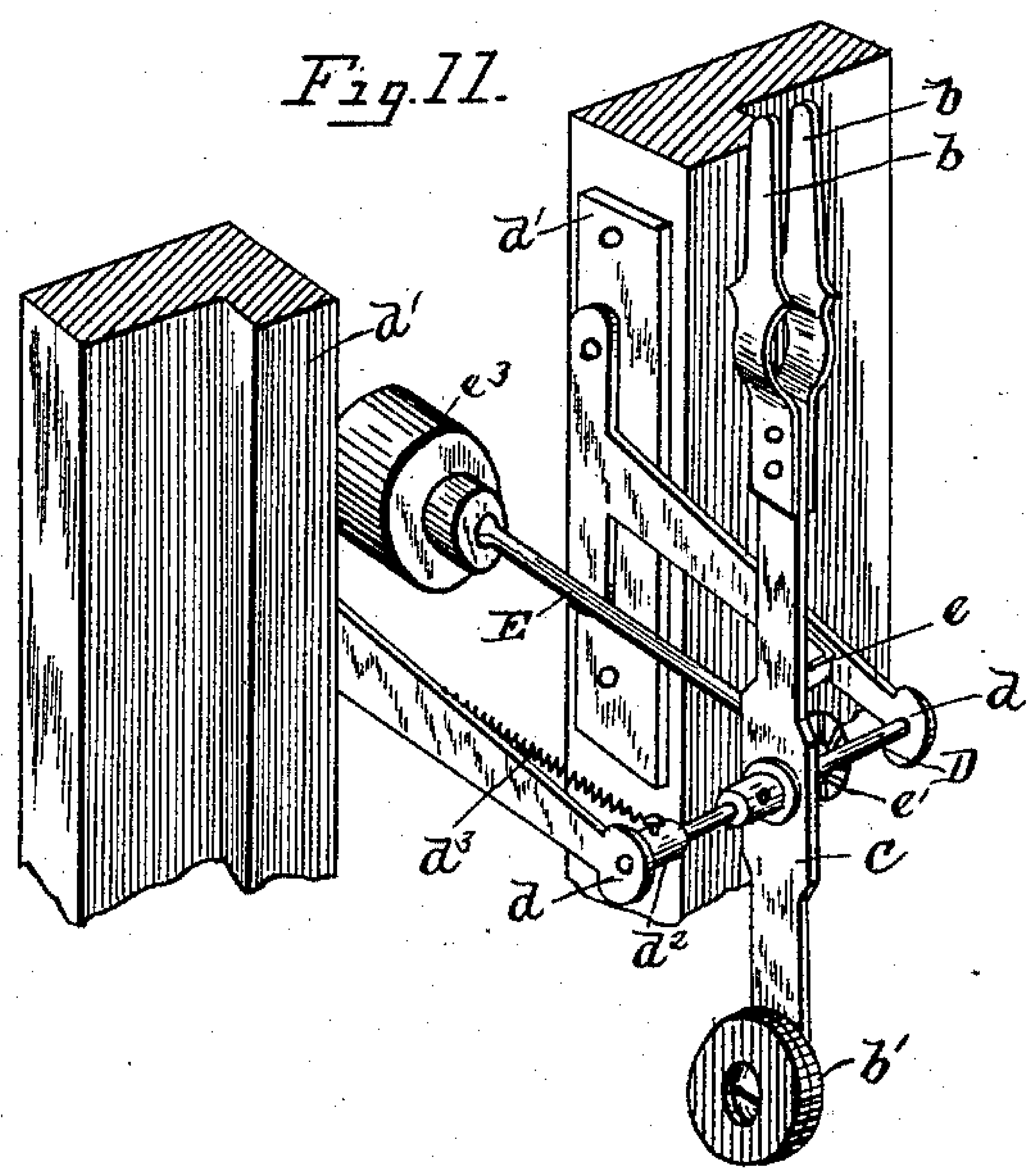


Fig. 12.

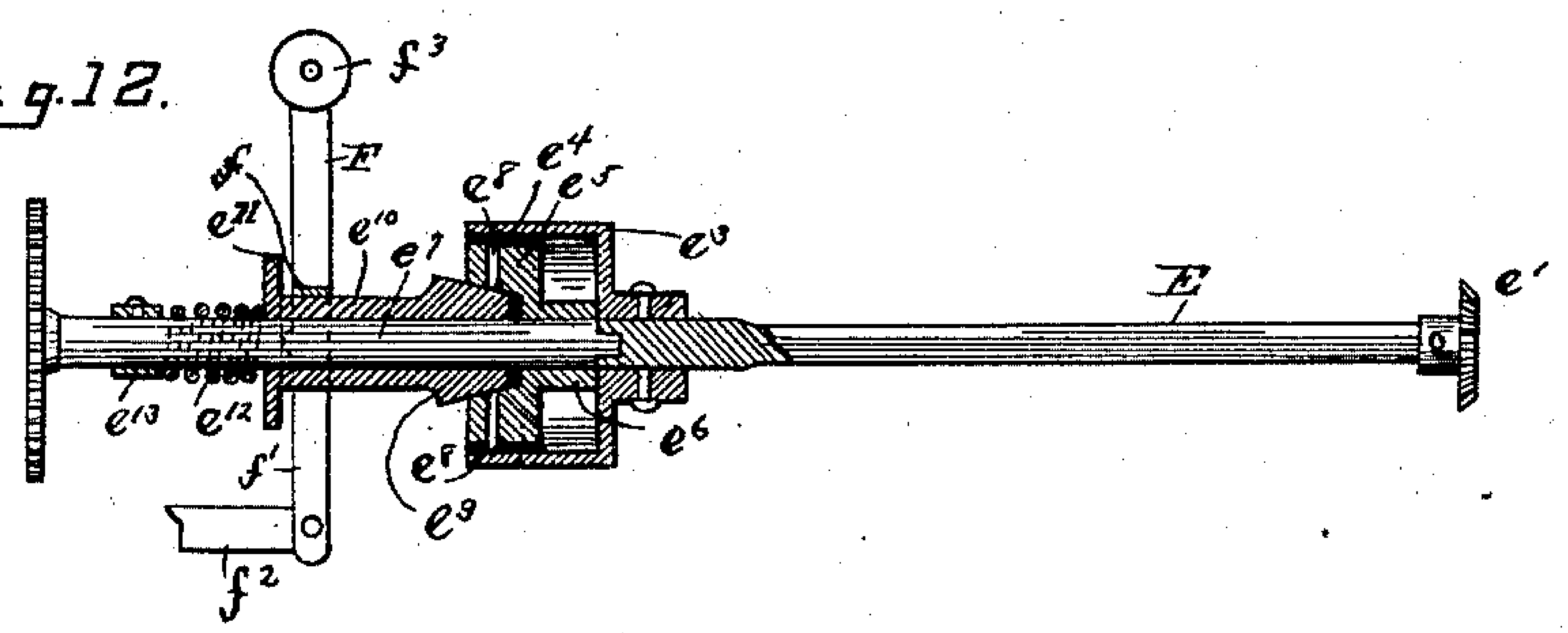
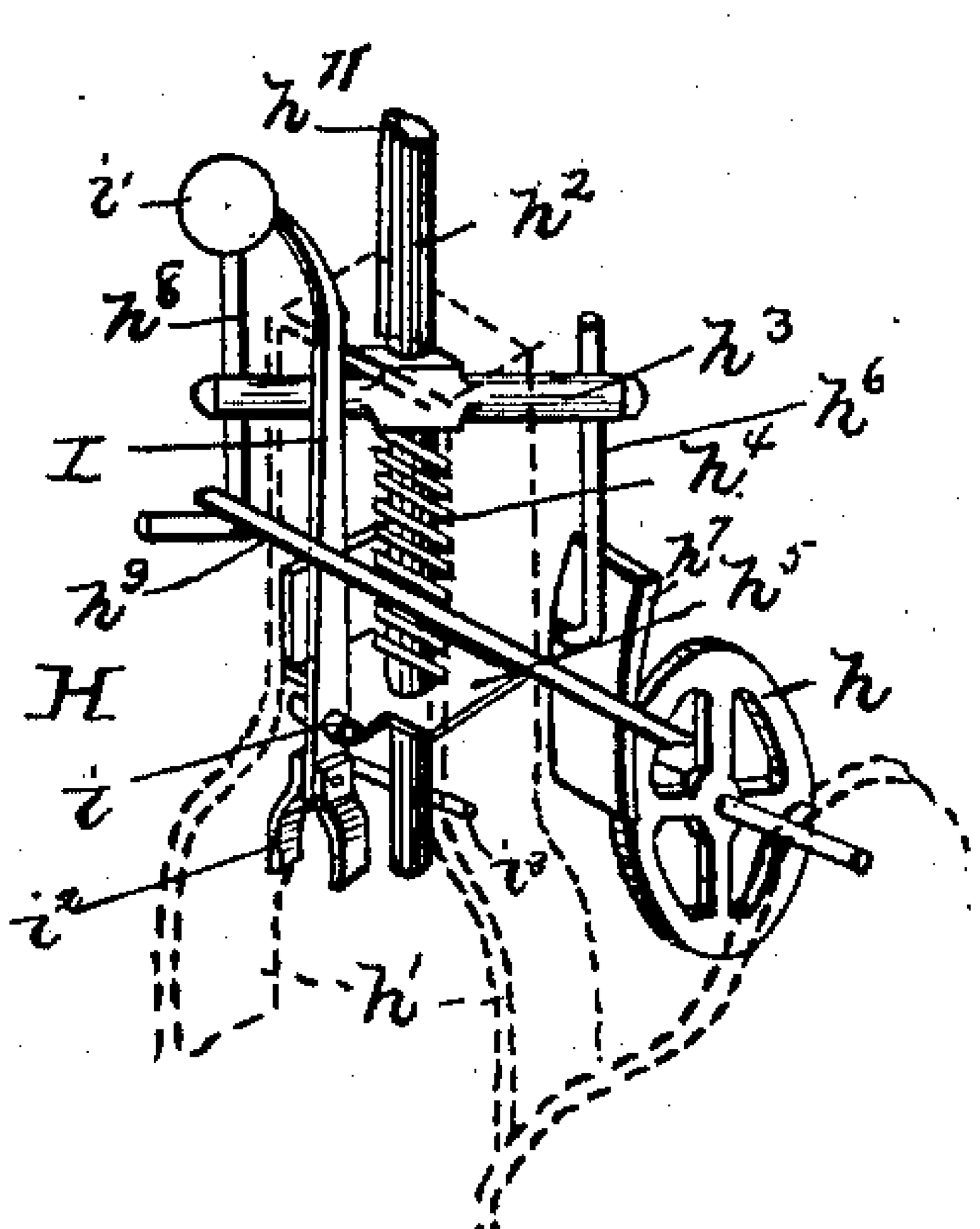


Fig. 13.



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UNITED STATES PATENT OFFICE.

WILLIAM H. SAYLES, OF CORNING, NEW YORK.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 441,981, dated December 2, 1890.

Application filed April 18, 1890. Serial No. 348,486. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SAYLES, a citizen of the United States of America, residing at Corning, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention pertains to certain new and useful improvements in railway-signals or time-indicators; and it has for its object the production of a new and improved device of this class, whereby the time of passage of a train is indicated within a certain limit to the next following train, and which is self-winding when operated and entirely automatic in its movement.

The invention comprises a signal having a minute-hand of limited movement, clock mechanism imparting motion to said minute-hand, means for automatically stopping and restarting said clock mechanism, and a depressible bar which is held continuously lowered during the passage of a train at the point where located, and means for automatically rewinding said clock mechanism; and the invention further comprises detail novel constructions, combinations, and arrangements, substantially as set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective showing my improved signal applied to the side of a track. Fig. 2 is an end elevation showing the operating-bar and its connection to a rail. Fig. 3 is a side view of said connection. Fig. 4 is a vertical sectional view on the line x x, Fig. 1, showing the operating-lever and its cable. Fig. 5 is a side view thereof, taken on a section through the inclosing-box of said lever. Fig. 6 is a front elevation showing my improved signal. Fig. 7 is a similar but enlarged view with one side of the inclosing-casing removed and a portion of the dial broken away. Fig. 8 is a vertical sectional view on the line y y, Fig. 7, taken through the clutch-connection of the minute-wheel shaft or arbor. Fig. 9 is a view in perspective of the levers and their connections for rewinding the clock mechanism. Fig. 10 is a vertical sectional view taken on the line z z, Fig. 7. Fig. 11 is a view in perspective of the minute-hand and its operating-shaft and adjuncts. Fig. 12 is a central longitudinal sectional view of said shaft, the clutch, and the means for operating the same. Fig. 13 is a view in perspective of the balance-wheel starting and stopping device.

Referring to the drawings, A designates the signal proper; a, a post, preferably metallic, having a lower portion a' secured in the ground adjacent a track, and a^2 a door or removable portion in the lower part of said post. Within the semicircular case a^3 of signal A is a double-face dial B, centrally located therein.

C is a minute or index hand having an outer double-pointed or bifurcated end formed by two parallel pointers b b, designed to move over both faces of the dial, so as to serve as an indicator visible from opposite directions. The other end of this hand has a light counterbalance-weight b'.

D is a shaft, upon which hand C is rigidly mounted, the ends of said shaft being secured so as to revolve in the outer ends of two parallel arms d d, rigidly attached to opposite walls of a box or casing d'. To a collar d^2 of shaft D is connected one end of a coil-spring d^3, the other end thereof being connected to one of the arms d or some other suitable point. This spring serves to return hand C to its starting-point when the clock mechanism is thrown out of gear.

E is a shaft supported at its forward end by an arm e, secured to one of the arms d, and it is provided with a bevel-pinion e', which gears with a similar pinion e^2, fast upon shaft D. To the rear end of this shaft E is secured a ring or hollow collar e^3, wherein fits a clutch e^4. This clutch consists of a ring or disk e^5, having a collar e^6 secured fast upon the shaft or arbor e^7 of the minute-wheel, and a series of short rods or teeth e^8 loosely disposed in holes or apertures of said ring or disk and capable of being forced outward and engaging ring or collar e^3 by means of the tapered or cone-shaped end e^9 of a movable sleeve e^{10}. This sleeve e^{10} is placed upon shaft or arbor e^7, and its other end has a collar e^{11}, against which bears a coil-spring e^{12}, which encircles shaft or arbor e^7 and bears at its other end against a collar e^{13} thereon.

F is an arm having a lower U-shaped portion f, which expands sleeve e^{10}, and the lower ends of the arms f' of said U-shaped portion are pivotally secured to the outer ends of a bracket f^2, made fast to the frame of the clock mechanism X. To the upper end of this arm F is secured a roller or wheel f^3, with which engages a plate or thickened portion f^4 on a vertical operating-rod G when said latter rod is drawn downward, causing the rearward movement of arm F and sleeve e^{10}, and consequently the withdrawal of the cone-shaped end of said sleeve from the clutch, thus effecting the loosening of the bite or engagement of the rods or teeth e^8 against ring e^3. This stops the revolution of shaft E, and the spring d^3 will return the hand C to its starting-point.

H designates the device for automatically stopping and restarting the movement of the balance-wheel h at and during the passage of a train. A vertically-disposed frame h' is secured to the frame of the clock mechanism, and through an upper aperture thereof is passed a rod h^2, having a transverse arm h^3, against which bears the upper end of a coil-spring h^4, the lower end thereof bearing against a cross-plate h^5 of frame h'. This rod h^2 is guided in its movement by a short rod h^{11}, secured thereto and extended through an elongated slot in the top of frame h'. To one end of arm h^3 is secured the upper end of an arm h^6 of a clutch or foot h^7, which when lowered bears tightly against the balance-wheel h and holds the same from turning, and when released imparts an initial movement to said wheel. To the other end of arm h^3 is connected an arm h^8, having a lower right-angular end, with which is designed to engage the end of an arm h^9, rigidly secured to rod G.

I is a lever fulcrumed at i between short arms of plate h^5. The upper end i' of this lever is weighted and its lower end i^2 is forked. When spring-held rod h^2 is lowered by arm h^9, bearing on arm h^8, lever I tilts forward at its upper end, and when said rod reaches the limit of its movement the forked end of said lever will engage a cross-pin i^3 of said rod and hold the same in its lowered position until the upper end of lever I is moved rearward by the engagement therewith of arm h^9 in the upward movement of rod G, at which time the rod h^2 being released will fly upward and the clutch or foot will impart an initial movement to the balance-wheel and start the working of the clock.

I will now describe the means by which the clock is automatically rewound at each operation of the signal.

J J designate the two mainsprings; j j, ratchet-wheels adjacent the ordinary gear-wheels j', and j^2 small spring-pressed pawls engaging said ratchet-wheels. The shafts or arbor j^3 of these mainsprings (to which said ratchet-wheels are secured) are extended and supported each by a bracket or arm j^4. To the outer ends of these shafts or arbors are keyed the upper ends of arms or levers K, the lower ends of which are provided with short studs k, projecting on either side and extended into opposite slots or openings k' of two parallel bars k^2. These bars k^2 are secured together and extend on either side of rod G and have a roller k^3 secured therein, with which is designed to engage a tapered block or plate k^4 (or it may be an enlargement) of said rod G.

The movement of the clock will cause the arms or lever K to move parallel with each other in the direction of the arrow w, and such movement thereof will continue until the index-hand (which is connected to the clock mechanism through the agency of the shafts D and E) shall have traversed the face of the dial and come in contact with the pin at the bottom of dial, such contact causing the clock mechanism to come to a standstill. As the clock mechanism is thus brought to a stop, the arm K adjacent plate k^4 of rod G is up against said plate, the roller k^3 being then at the lower inner end of the tapering portion thereof. The parts so remain until the bar G is lowered, when its plate k^4 will press against the roller k^3, and through the agency of connecting-bars k^2 return arms or levers K to their original position, and thus effect the winding of the springs by the turning of the shafts or arbors thereof, to which said arms or levers are secured. From the foregoing it will be seen that as the rod G is lowered three results are simultaneously secured: first, the stopping of the movement of the clock mechanism; second, the return of the indicating-hand to the starting-point, and, third, the rewinding of the clock-springs. In the elevation or return movement of said rod the clock mechanism is again started by the initial movement imparted to the balance-wheel.

While it is obvious that various means may be employed for operating the signal hereinbefore described, yet that specially designed therefor will now be specifically set forth.

The operating-rod G is extended down through port a, and may, as shown in Fig. 6, have a coil-spring g encircling its lower end and held by a collar g' and a partition or apertured cross-piece g^2; or said spring-pressure may be applied to the upper end of said rod, as shown in Fig. 7, wherein a coil-spring g^3, encircling said rod, is disposed in a hollow tube or cylinder g^4, connected to the top or roof of box or casing d'. To the lower end of rod G is connected by a turn-buckle g^5 one end of a rope or cable L, which, after being passed around a pulley l, hung in post a, is extended through a pipe l' beneath the rails of a track W, and connected to the lower free end of a lever M. This lever is secured upon a pivotal rod m, which is preferably made in two or three parts or sections of equal length, the conjoint length of said sections being about forty feet, (the distance between the wheel-trucks of a passenger-car.) This rod is supported throughout its length, so as to be free to turn, by a series of supporting arms

or bearings N. Each arm or bearing comprises two parts or members n n', having hooked portions n^2, which hug opposite points of the lower flange of a rail, and are firmly bound thereon by a nutted bolt n^3, which holds together the lower flanged ends n^4 of said parts n n'. To the bar m between the upper forked ends of the part n of each bearing is rigidly secured the circular portion of an arm n^5, having an outer flange n^6.

O is a long continuous bar secured throughout its length to the flanged ends of arms n^5. This bar occupies an inclined position parallel with and adjacent to the tread of the adjoining rail, above which it projects a short distance sufficient to be engaged and depressed by the slight projecting portion of the periphery of a car-wheel. This bar is held continuously depressed during the passage of a train.

The inner opposite ends of the sections of rod m are projected into a box or casing P, which is secured to the flange of a rail in a manner similar to the arms or bearings N. To the inner end of one section of this bar lever M is rigidly connected, and on either side of said lever are two arms p p', the former being connected to the end of the other section of the bar. The lower ends of these arms work in the slotted ends of a bar or cross-head p^2, rigidly secured to lever M, whereby the movement of one section of rod m permits a similar motion of the other section by reason of the movement of lever M and cross-head p^2.

In the front wall of box or casing P is screwed a bolt Q, held at the proper adjustment by a check-nut q. The inner end of this bolt is on a line with the lever M, and the extent of the movement of the latter is controlled by the adjustment thereof. By means of this adjustable bolt the position of the depressible bar O with relation to the tread of the rail can be adjusted, and hence a greater or lesser movement can be imparted to the operating-rod G, according as the adjustment of the parts may require.

In practice the clock mechanism will be set in motion at the passage of a train with the indicating-hand at one (1) or the starting-point, the same being indicated on both sides of the dials by the double-pointed ends of said hand. Should the next following train pass the point where the signal is located before the hand reaches the limit of its movement, (thirty minutes being preferably elected) the elapsed time since the passage of the previous train will be indicated. Immediately upon contact of the wheel of the engine or front car with the depressible bar O the latter will be lowered, and through the agency of rod m, lever M, and cable L will instantly effect the lowering of or a downward pull on operating-rod G. The initial movement of this rod will effect the disengagement of the clutch between the minute-wheel shaft or arbor and shaft E and permit the indicating-hand C to return to its starting-point at the top of the dial. The further or complete movement of rod G will cause the rewinding of the mainsprings of the clock and at the same time the clutch or foot h^7 will bind the balance-wheel as against movement, thus completely stopping the working of the clock. By making the bar O of the length stated the same is held depressed until the rear truck of the last car has passed thereover, immediately upon which the rod G will be elevated by the action of the spring, and the restarting device being freed by the arm h^9 of rod G the clutch or foot thereof will turn the balance-wheel and set the clock mechanism in motion. At the same time the cone-shaped end of the spring-pressed sleeve will be moved forward and the clutch-connection established with the shaft E, and thus again starting the indicating-hand on its movement. By reason of the double-face dial the engineer of a passing train is enabled to observe from the opposite side whether or not the signal has been operated and reset.

I am aware that it is not new to employ a double dial for a railway-signal; but I am not aware of any such device having one hand serving as an indicator for both dials.

The advantages of my invention will be at once apparent to those skilled in the art to which it appertains, and as they are so obvious need not here be specifically mentioned.

I claim as my invention—

1. In a railway-signal, the combination of the dial, a depressible bar adjacent the track, a clock mechanism located in said signal and having an indicating-hand traveling over said dial, an automatic stopping and restarting device designed to engage the escapement-wheel of said clock mechanism, means for automatically rewinding said clock, and the connection between said depressible bar and the signal by which said automatic stopping and restarting device is operated and the clock is rewound at each operation of said bar, substantially as set forth.

2. In a railway-signal having a double dial, the combination, with the clock mechanism, of an indicating-hand having an outer double bifurcated end extending over both faces of said dial, a shaft upon which said hand is pivoted, provided with a pinion, the parallel supporting-arms for said shaft, the shaft E, located between said arms and having a pinion on its outer end engaging said former pinion, and a clutch-connection between the inner end of said shaft E and the shaft or arbor of the minute-wheel, substantially as set forth.

3. In a railway-signal, the combination, with the clock mechanism, of an indicating-hand having a lower weighted end, a shaft upon which said hand is pivoted, provided with a pinion at its center, the parallel supporting-arms for said shaft, the shaft E, located between said arms and having a pinion on its outer end engaging said former pinion, and

a clutch-connection between the inner end of said shaft E and the shaft or arbor of the minute-wheel, substantially as set forth.

4. In a railway-signal, the combination, with the clock mechanism, of an indicating-hand, its operating-shaft having a ring or collar at its rear end, the clutch having a series of short rods, and the movable sleeve for binding said rods against said ring or collar, substantially as set forth.

5. In a railway-signal, the combination, with a clock mechanism, of an indicating-hand, its operating-shaft having a ring or collar at its rear end, the clutch-ring secured to the minute-wheel shaft or arbor, having a series of short rods, and the spring-pressed sleeve having an enlarged end for forcing said rods outward, substantially as set forth.

6. In a railway-signal, the combination, with the clock mechanism, of an indicating-hand, its operating-shaft having a ring or collar at its rear end, the clutch having a series of short rods, the spring-pressed sleeve for binding said rods against said ring or collar, the pivoted arm for retracting said sleeve, and the operating-rod for moving said arm, substantially as set forth.

7. In a railway-signal, the combination, with the clock mechanism, of an indicating-hand, its operating-shaft having a ring or collar at its rear end, the clutch-ring secured to the minute-wheel shaft or arbor, having a series of short rods, the movable sleeve having an enlarged or cone-shaped end for forcing said rods outward, the spring bearing against said sleeve, the arm F, pivoted at its lower end or ends for retracting said sleeve and having a roller at its upper end, and the operating-rod having a plate or thickened portion for engaging said roller and moving said arm, substantially as set forth.

8. In a railway-signal, the combination, with the clock mechanism, a spring-held operating-rod, and a long depressible bar disposed adjacent to the tread of the track-rail and designed to be continuously depressed during the passage of a train, and the described connection between said rod and bar, of an automatic stopping and restarting device designed to engage and clutch the balance-wheel of said clock mechanism when said rod and bar are lowered and depressed by a passing train, and to be so held and to be disengaged therefrom and automatically restart said clock mechanism in the elevation of said rod and bar after the passage of the entire train, substantially as set forth.

9. In a railway-signal, the combination, with the clock mechanism and an operating-rod, of a spring-held sliding rod carrying a clutch or foot which engages the balance-wheel of said clock mechanism in the movement of said operating-rod and which automatically restarts said balance-wheel when said rod is elevated, substantially as set forth.

10. In a railway-signal, the combination, with the clock mechanism and an operating-rod having an arm, of a spring-pressed sliding rod having a clutch or foot secured thereto, and a lever having a lower forked end for engaging or holding said sliding rod when depressed, substantially as set forth, said lever and sliding rod being disengaged by said arm of the operating-rod in the elevation thereof, as stated.

11. In a railway-signal, the combination, with the clock mechanism and an operating-rod having an arm h^9, of a stopping and restarting device consisting of a supporting-frame, a spring-pressed rod h^2, having a transverse arm, a clutch or foot secured to said arm for binding the escapement-wheel when lowered, the arm h^8, designed to be engaged by said arm h^9, the lever having an upper weighted end and a lower forked end for engaging a stud of said rod h^2, said lever being disengaged therefrom in the upward movement of said arm h^9, permitting the elevation of rod h^2, together with the clutch or foot, imparting motion to said escapement-wheel, substantially as set forth.

12. In a railway-signal, the combination of the clock mechanism having the shafts or arbors of its mainsprings extended, the arms or levers secured to the outer ends of said shafts or arbors, the bar connecting the lower ends of said arms or levers, and the operating-rod having engagement with said bar for rewinding said springs, substantially as set forth.

13. In a railway-signal, the combination of the clock mechanism having the shafts or arbors of its mainsprings extended, the arms or levers secured to the outer ends of said shafts or arbors and having studs in their lower ends, the connecting-bars having slots in their ends, wherein said studs project, and the operating-rod G, having an enlargement or plate for effecting the conjoint rewinding of said springs when said rod is lowered, substantially as set forth.

14. The combination, with a railway-signal, of a long depressible bar disposed adjacent to the tread of a track-trail and designed to be continuously depressed during the passage of a train, a pivotal rod to which said bar is connected, and the connection between said rod and the railway-signal, substantially as set forth.

15. The combination, with a railway-signal, of a long depressible bar designed to be continuously depressed during the passage of a train, a pivotal rod to which said bar is connected throughout its length, the series of arms or bearings for said rod, secured to the lower rail-flange, the lever connected to said pivotal rod, and the connection between the same and said railway-signal, substantially as set forth.

16. The combination, with a railway-signal, of a depressible bar, the arms to which said bar is connected, the pivotal rod to which said arms are secured, the lever connected to said rod and having connection with the rail-

way-signal, and the adjustable bolt for regulating the movement of said lever and the adjustment of said depressible bar, substantially as set forth.

17. The combination, with the depressible bar, the arms to which said bar is connected, the pivotal rod to which said arms are secured, the arms or bearings for said rod, formed in two parts, having hooked portions engaging the lower flange of a rail, and the nutted bolt for binding said parts together, substantially as set forth.

18. The combination, with a railway-signal, of the depressible bar and its arms, the pivotal rod formed in two parts or sections, together with its arms or bearings, the lever M, secured to the inner end of one of said parts or sections and having a cross-head, the adjacent arms secured to opposite ends of said parts or sections and engaged by said cross-head, and the connection between said lever and the railway-signal, substantially as set forth.

19. The combination, with a railway-signal, of the spring-pressed operating-rod G, the depressible bar disposed adjacent to the tread of a track-rail and designed to be continuously depressed during the passage of a train, the pivotal rod to which said bar is connected, the lever M, connected at its upper end to said rod, and the cable connected at one end to the lower end of said lever and at its other end having an adjustable connection with said operating-rod, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. SAYLES.

Witnesses:

H. PRITCHARD,

ELLSWORTH D. MILLS.