(No Model.) 3 Sheets—Sheet 1.

H. G. KRASKY, E. E. LOMMATZSCH & J. KUEFFER.

AUTOMATIC STATION INDICATOR FOR RAILWAY CARS.

No. 414,885. Patented Nov. 12, 1889.

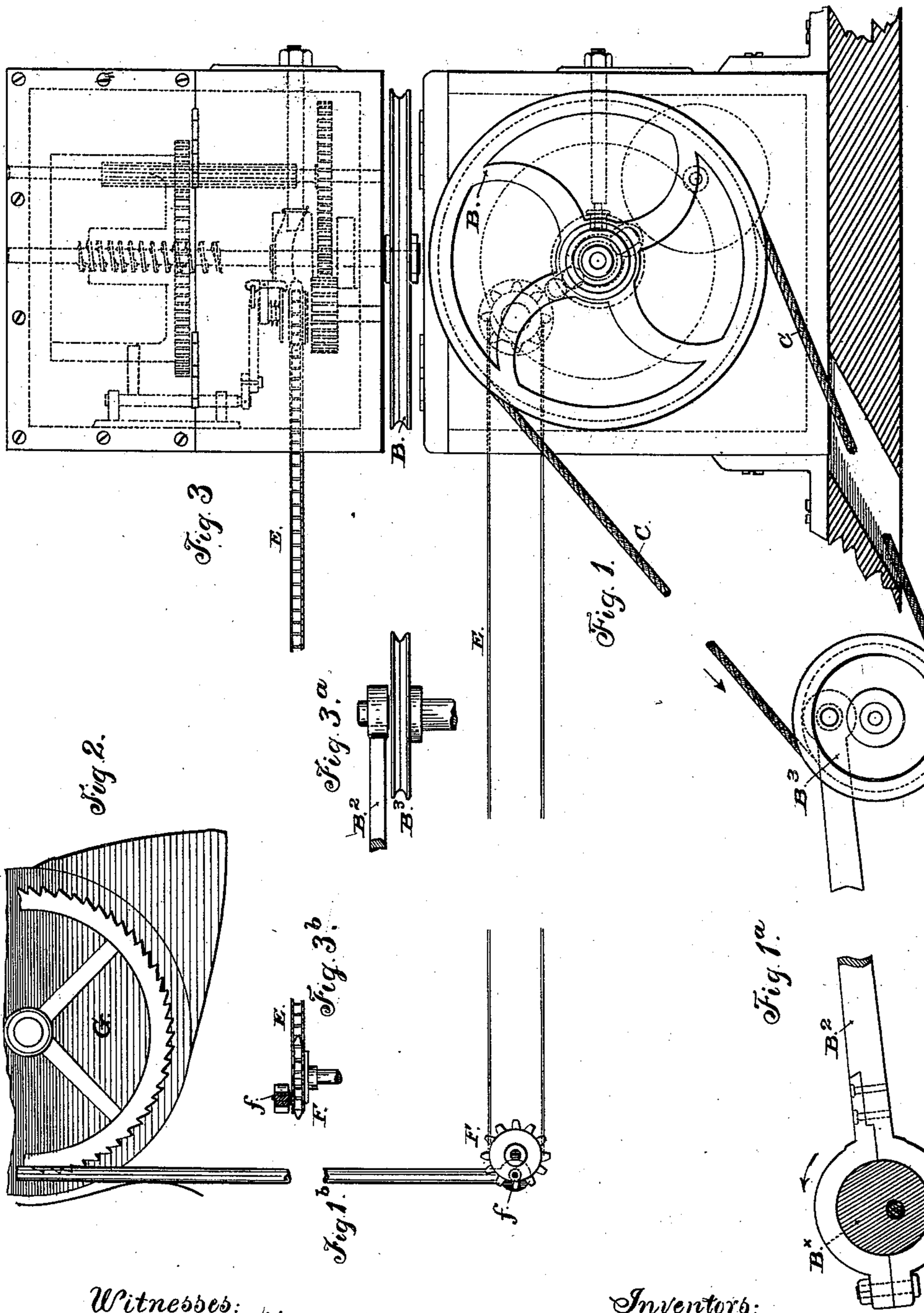

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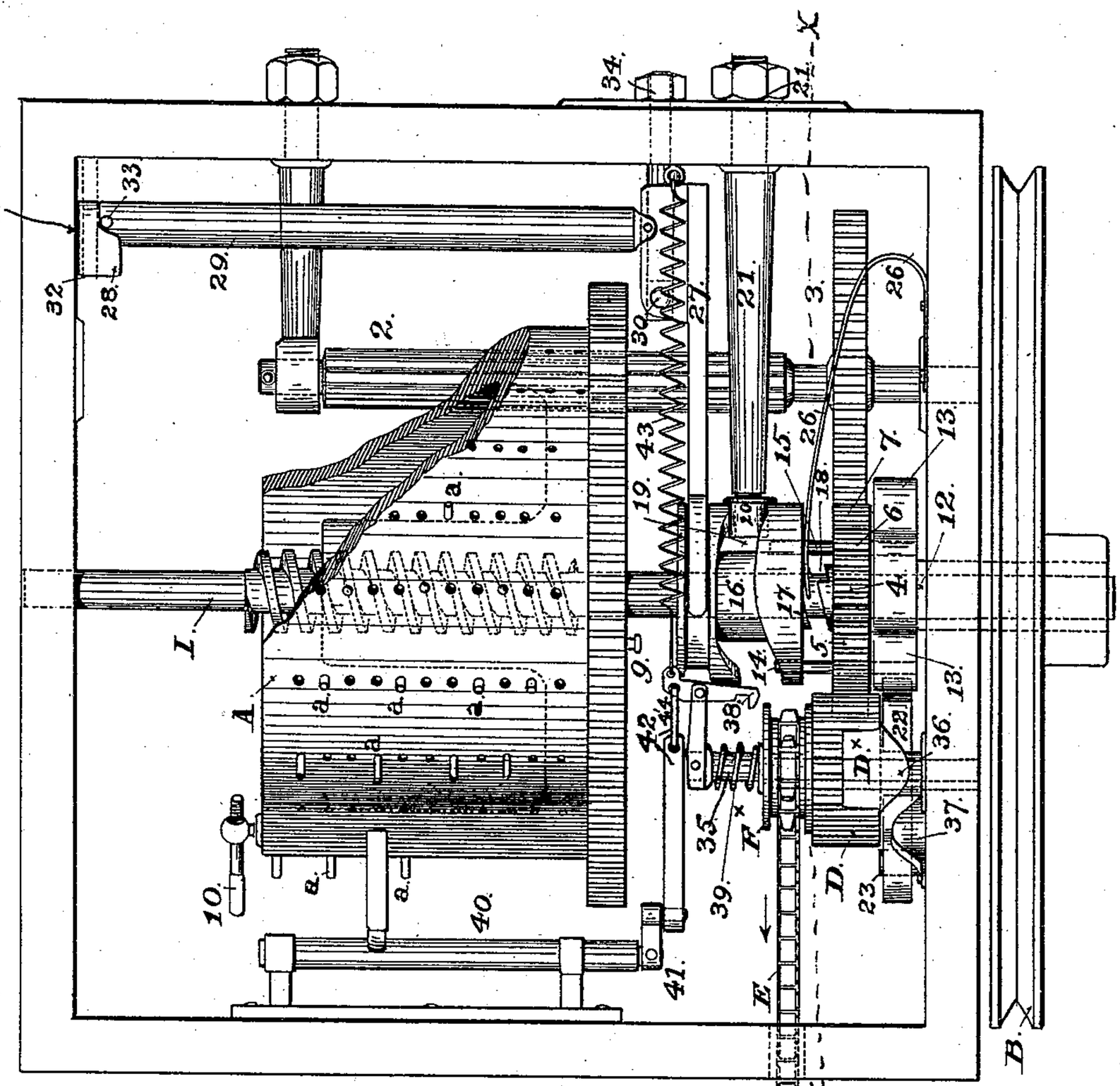
Fig 4.



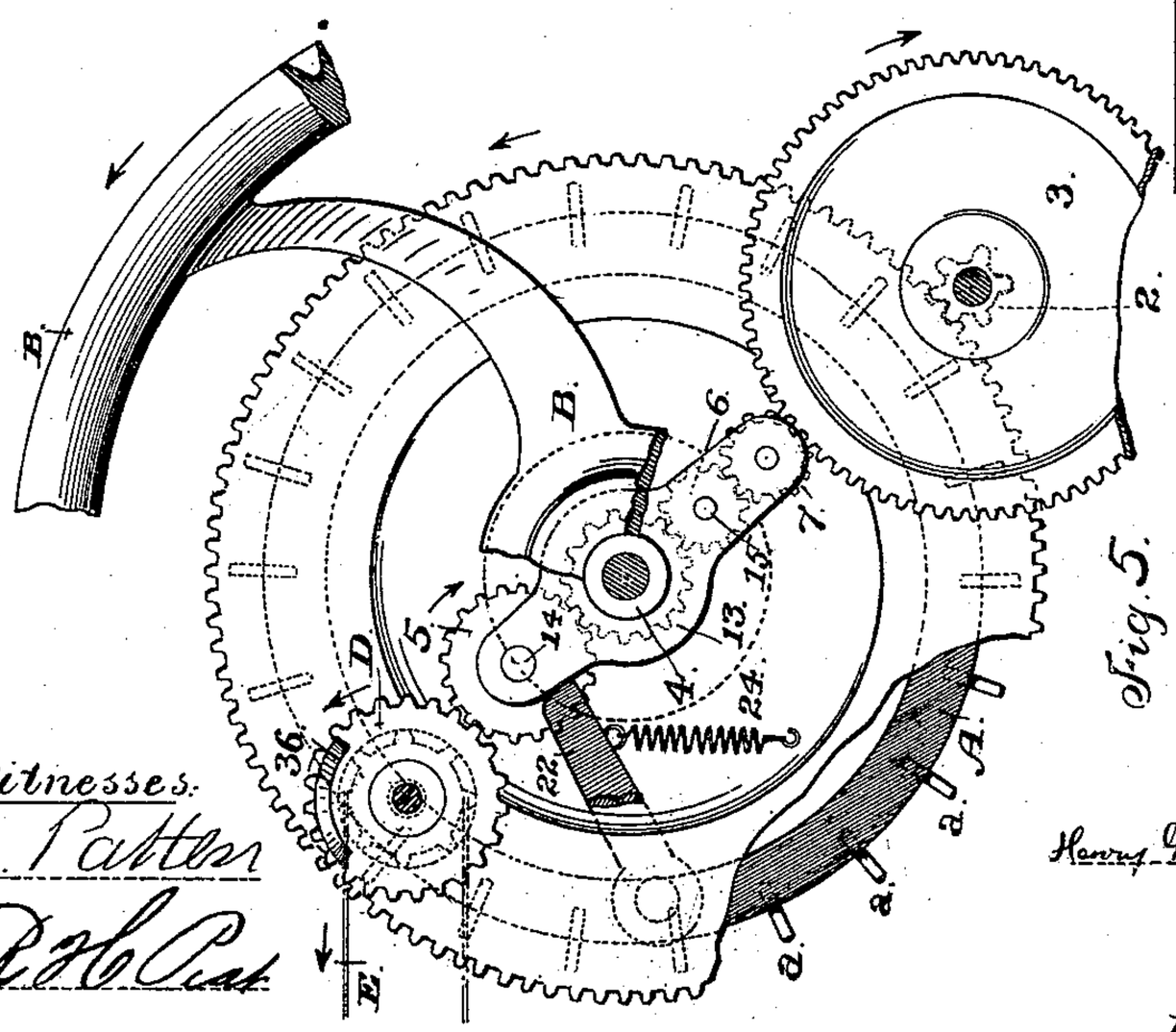


Fig. 5.

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(No Model.) 3 Sheets—Sheet 3.

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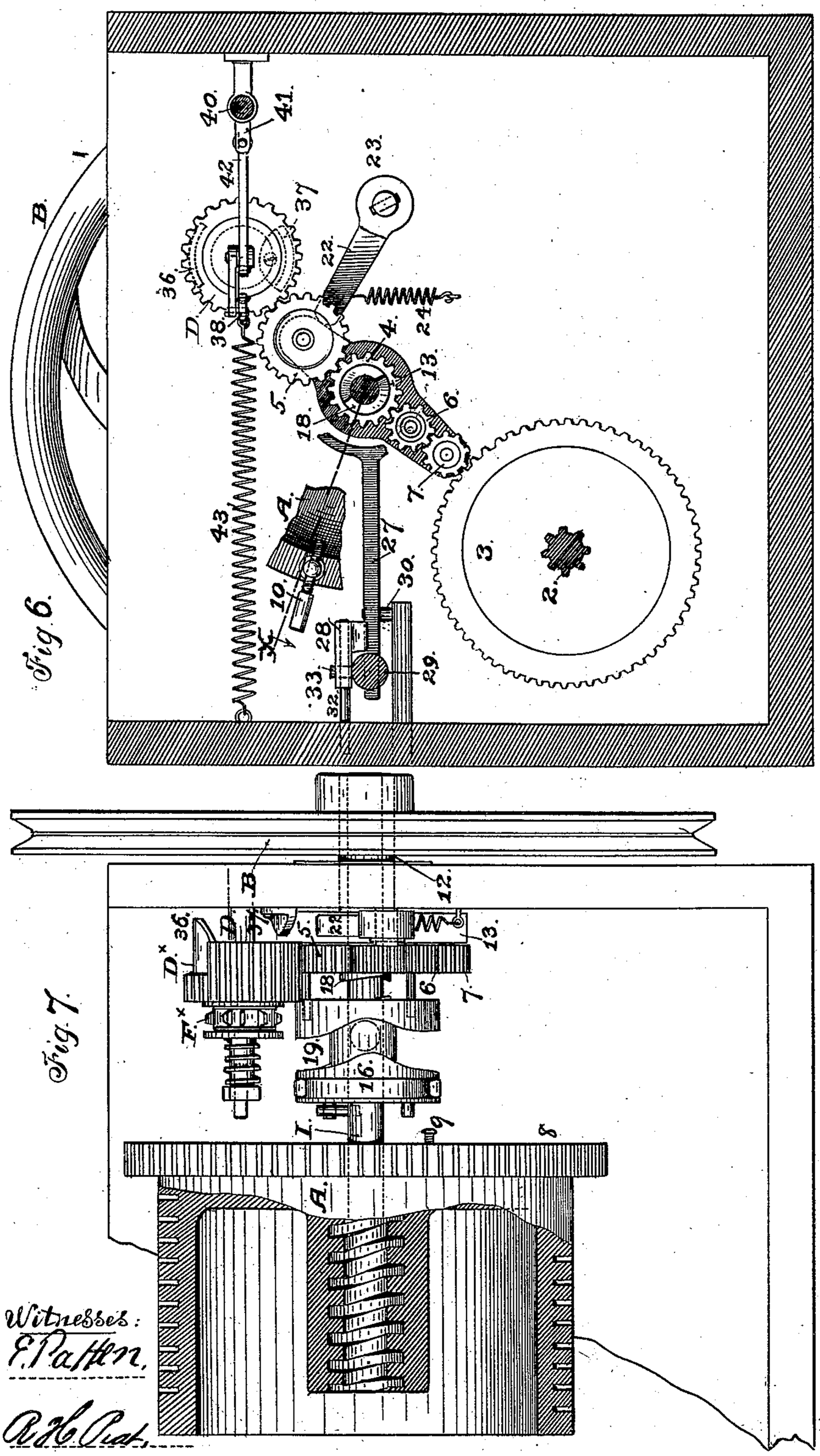

Fig. 6.

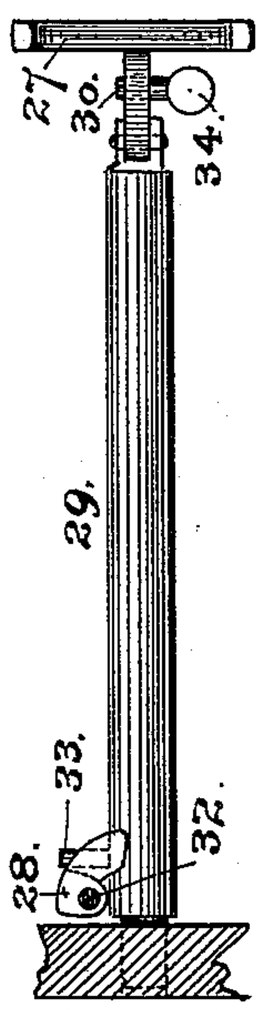

Fig. 8.

Fig. 7.

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UNITED STATES PATENT OFFICE.

HENRY G. KRASKY, E. EMIL LOMMATZSCH, AND JOHN KUEFFER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNORS TO THE GOLDEN GATE AUTOMATIC STREET AND STATION INDICATOR COMPANY, OF SAME PLACE.

AUTOMATIC STATION-INDICATOR FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 414,885, dated November 12, 1889.

Application filed April 16, 1888. Renewed May 11, 1889. Serial No. 310,486. (No model.)

To all whom it may concern:

Be it known that we, HENRY G. KRASKY, E. EMIL LOMMATZSCH, and JOHN KUEFFER, citizens of the United States, residing in the city and county of San Francisco, and State of California, have invented certain new and useful Improvements in Automatic Station-Indicators for Railway-Cars; and we do hereby declare that the following is a full, clear, and exact description of our said invention, reference being had to the drawings that accompany and form part of this specification.

Our invention relates to an improved automatic mechanism for operating a street or station indicator in a railway-car; and it consists in certain novel construction and combination of parts and mechanism, as hereinafter fully described and pointed out, by which a box or indicating device in a car is operated at given intervals of time in the travel of the car and caused to display the names of the stations in successive order and in an automatic manner.

The following description fully explains the nature of our said invention and the manner in which we proceed to construct, produce, and apply the same, reference being had to the accompanying drawings by figures and letters.

Figure 1 shows the automatic mechanism as set up in position and connected with the indicator-box in the car above. Fig. 1^a shows the eccentric on the car-axle, the connecting-rod, and the driving-sheave by means of which motion is transmitted from the axle to the mechanism. Fig. 1^b shows the indicator-rod and connections by which the mechanism moves the rod at required intervals. Fig. 2 shows the lower portion of the indicator in side view. Figs. 3, 3^a, and 3^b are top views of the above-mentioned Figs. 1, 1^a, and 1^b. Fig. 4 is a top view, on a larger scale, of the automatic mechanism, the cover of the inclosing-box being taken off and a portion of the time-cylinder being broken away to expose parts beneath. Fig. 5 shows the system of driving-gears in front view. Fig. 6 is a view of the gearing, taken from the opposite side, and is a vertical section through the dotted line $x\,x$, Fig. 4, and certain other parts not properly in the section being included to indicate their engagement, the time-cylinder and its gear-wheel not being shown. Fig. 7 is a side view of Fig. 6, taken from its right-hand side, and showing, also, the time-cylinder in position and partly in section. Fig. 8 shows the shifting-lever and operating parts in side view that are seen in plan at the left-hand side of Fig. 4 and in end view in Fig. 6.

Similar letters of reference indicate like parts in all the figures of the drawings.

The parts of this automatic mechanism consist of a drum or cylinder A, having continuous rotation in connection with a longitudinal travel on its shaft, a reversing mechanism for changing the direction of the longitudinal movement at each end thereof, a system of driving-gears deriving their motions from the car-axle and producing continuous movement of the cylinder, an intermittently-actuated pinion producing when set in motion the required movements in the indicator-box by or through drive-chains and sprocket-wheels or other suitable connections for transmitting or changing the motion, and mechanism operated by stops or pins on the cylinder to throw the indicator-operating pinion into action and to hold it out of action. These parts are mounted for protection in a box having a hinged cover for convenience of access to clean and adjust the parts, and the driving-gear is actuated from the outside by a sheave B, that receives motion from the car-axle. The simplest way of doing this is by an eccentric $B^\times$ on the axle, a connecting-rod B^2, and a sheave B^3, and chain or belt C, these parts being fixed beneath the car and the belt being carried through slots up to the automatic mechanism, which may be placed and fixed in any convenient part of the car, under the seat or elsewhere. From this point connection of the intermittently-operated pinion with the indicator-box in the upper part of the car is made by the drive-chain E and the sprocket-wheels F $F^\times$, the former being fixed in suitable position under the indicator-box G, where its movements can be con-

veniently applied to the indicator and the latter fixed to the pinion D.

The indicator shown at G, Fig. 2, is of that class which is operated by the movements of a vertical rod, and where our improved mechanism is used to work such indicators the required movements are obtained from a crank-pin *f* on the sheave, as seen in Figs. 1[b] and 3[b].

The part A, which we designate and shall herein refer to as the "time-cylinder," is mounted on a fixed screw-shaft 1, and is rotated with a continuous movement on this shaft as a center by means of the long pinion 2, the spur-gear 3 on the shaft of the long pinion, the driving-gear 4 on the shaft of the propelling-sheave B, and the system of connecting-gears 5 6 7, the time-cylinder being geared into the long pinion by the spur-wheel 8. These parts drive the cylinder, and also cause it to move in a longitudinal direction on its shaft. At each end of such travel, as the cylinder reaches the end of its shaft, the direction of rotation is changed, so that the cylinder returns along the shaft to the opposite end. Reverse movement of the cylinder at such times is produced by reversing the relative positions of the gears 5, 6, and 7, by which the gear 5 is substituted for the two gears 6 7, and the spur-wheel 3 is then directly connected with the driving-pinion 4 by the pinion 5, instead of by the two gears 6 and 7, in consequence of which the cylinder is driven in the opposite direction. This change in the positions of the gears is effected by means of two stops 9 and 10 on the ends of the cylinder and the following arrangement of mechanism: The shaft 12 of the sheave B is a sleeve turning loosely on the end of the fixed shaft 1, and the gear 4 is fixed on and is driven by the sleeve. At the front of the gear 4, between it and the side of the box, is a block 13, free to turn around the sleeve and having the arbors of the three gears 5 6 7 mounted in it. The spur-wheel 3 and the principal pinion D have such position with respect to the other gears that when the block 13 is turned on the sleeve end for end the positions of the outside gears 5 and 6 are reversed, and where one was in gear with the spur-wheel 3 the other will thereby be substituted for it, and in like manner the connection of the pinion D with the driving-gear 4 will be changed. To turn the block 13 in this manner, the arbors 14 15 of the two gears are mounted in a loosely-turning sleeve or spool 16, supported on the fixed shaft as well as in the block 13, and by means of the clutches 17 18, one part on the gear 4 and the other on the front face of the spool 16, this part is locked to the gear when the two parts are brought together, and the gear 4 is thus made to turn the block around end for end. A cam-groove 19 in the circumference of the spool, with a roller 20 on the end of a fixed spindle 21 playing into the groove, operates to limit the extent of this movement of the spool and block, the groove being so shaped that the spool is caused to move back away from the gear 4 and separate the clutches at the proper moment. The yielding stop 22, pivoted at 23 to the side of the box, sets under the upper end of the block 13 to hold it in place after each time of change and while the sheave B is running. This sheave travels in the direction of the arrow X, Fig. 6, when the mechanism is working, it being understood in such case that the car on which it is mounted for operation does not change its position with respect to the direction of travel, but presents always the same end to the front.

The stop 22 yields to allow the block 13 to pass it, and is brought back into place by the coil-spring 24, that is secured at its lower end to the box.

The cam-sleeve 16 is held back out of contact with the gear 4 by the flat spring 26, but as the front end of the time-cylinder is brought by its longitudinal movement up against the back of the sleeve or spool the stop 9 presses the spool forward and brings the clutches together. By this means the direction of rotation is reversed and the cylinder is made to rotate in the opposite direction. Now, when the other end of the fixed shaft is reached the other stop 10 on the back end of the cylinder is caused to throw the spool against the gear 4 through the medium of the shifting-lever 27, the stop being made to act upon it through the eccentric-block 28 and the push-rod 29, that is pivoted at one end to the lever 27 behind its fulcrum 30, and is supported at the opposite end in the side of the box at 31. The eccentric-block is carried on a stud 32 and sets against the pin 33 on the rod, while it also stands in the path of the stop 10, to be struck by it as the cylinder in its rotations brings the stop against the eccentric. The end of the shifting-lever is forked to embrace the cam-sleeve, and its fulcrum 30 is fixed in the spindle 34, that sets through the side of the box.

The principal pinion D is mounted to turn on the fixed shaft 35, and in position to engage the driving-gears on the block 13 with either end, one of which it meshes according to the position given to the block; but as the motion required in this pinion is intermittent and not continuous, in order to properly work the indicator above the pinion is cut away on a portion of its face at $D^{\times}$ to remove the teeth, so that when this mutilated part of the gear is brought in line with the driving-pinion the gear will stand at rest, but by throwing this part out of line the gear will be moved. Lateral movements of the gear D, to effect the required stop-motion, are produced by the incline 36 on the pinion, and an incline 37, of similar form, fixed against the side of the box in position to act on the incline on the pinion at the proper time in its rotation as the mutilated portion comes in line with the driving-gear. The pinion, being shifted in this manner on the fixed shaft, is held back by a pivoted catch 38, which engages with

the flange of the sprocket-wheel F×, and the parts thus thrown out of gear remain at rest until the catch is thrown off. At such time the coil-spring 39 on the fixed shaft 35 throws the pinion into gear again. One revolution then takes place, and the inclines 36 37 then throw the gears out of action and the catch 38 holds them.

The time-cylinder A, operating on the catch 38, causes it to release the pinion at intervals of time more or less apart, through the agency of the rock-shaft 40, the crank 41, and the connecting-link 42. By means of a series of pins or studs *a a*, projecting from the surface of the cylinder, and the tripping-arm on the rock-shaft the catch 38 is drawn back and the pinion released as often as the rotation of the cylinder brings a pin against the end of the tripping-lever, the pins being set to produce this action at the required intervals in the movements of the car along the track. By the positions of these pins, therefore, the intervals of movement of the indicator above are regulated.

The pins *a a* are set in spiral order around the surface of the cylinder, and provision is made for setting them in different positions to regulate the times of operation of the indicator by having a number of holes in rows on the cylinder, so that the order of the pins can be changed. As the cylinder has a progressive movement along its shaft as well as a rotative movement, it is evident that the pins require to be set in spiral manner, and that the pitch of this spiral and the intervals of space between the pins on this spiral will determine the frequency of the movement produced in the rock-shaft 40.

The hooked end of the catch is held down by the coil-spring 43, and the crank 41, acting in direction against the spring, is attached to the same end of the catch-lever by the connecting-rod 42 and the link 44. The position and arrangement of these parts are clearly shown in Figs. 4 and 6 of the drawings.

In setting up and adjusting our improved mechanism for operation on a car, motion is transmitted from one of the car-axles to the propelling-sheave B in such manner as to produce regular and continuous motion in the travel of the car, and the pins *a a* of the time-cylinder are set in required order to act upon the arm of the rock-shaft 40 at suitable times to move the indicator just before each street or station is approached. The positions of the pins on the time-cylinder being determined for one car, it is evident that the mechanisms for all the other cars of the same road can be regulated from it, as well as for all cars of other roads that have the streets or stations located at about the same distances apart.

This automatic mechanism is adapted to operate all the various kinds of indicators now in use that are capable of being worked either by the rotation of a shaft or a rectilinear motion.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a station-indicator for railway-cars, the time-cylinder A, having both continuous rotation and longitudinal progression, the gear 3, receiving motion from the car-axle and giving motion to the time-cylinder, as described, through suitable connecting-gearing, the mutilated pinion D, connected with the indicating device to be operated by suitable mechanism—such as sprocket-wheels and drive-chains—and engaging with the driving-gears to be operated by the movements of the gear 3 when in gear, a throwing-off device which is adapted to throw and hold the said pinion out of play at a given point in its revolution, and a releasing mechanism which is operated upon by stop-pins on the time-cylinder to release the said pinion, and a spring to throw the pinion into gear, all in combination, to operate as set forth.

2. In combination with the time-cylinder A, mounted for rotation on a screw-shaft, the driving mechanism consisting of the continuously-operated shaft carrying the gear 3, the long pinion 2, geared into said gear 3, the spur-gear on the cylinder, and the gears 5 6 7, arranged for operation, as described, for reversing the motion of the long pinion, substantially as and for the purpose set forth.

3. In combination with the time-cylinder and the gearing by which it is rotated and caused to travel on its shaft, the driving-gear 3, the intermediate gears 5, 6, and 7, capable of being reversed in position to connect the gear 3 with the time-cylinder gearing either by the single gear 5 or by the double gears of the train, and mechanism by which the said train of gears is changed at each end of the longitudinal travel of the said cylinder, consisting, essentially, of the loose sleeve 16, clutches 17, the gear-carrying block 13, the studs on which the gears are mounted having their ends set through the head of the sleeve, the cam-groove 19, and fixed spindle 21, spring 26, the stops 9 and 10 on the ends of the cylinder, the shifting-lever 27, and means by which the cylinder-stop 10 is made to throw the said lever at the end of the longitudinal movement of the cylinder, as set forth.

4. Automatic operating mechanism for station-indicators on railway-cars, consisting, essentially, of a principal pinion D, having connection with the indicator and with a continuously-running gear, a throwing-off device by which said pinion at a given point in its rotation is thrown out of gear and held out of action, a spring by which said pinion when released is set into gear, a releasing device to bring the pinion into play, and a continuously-rotating cylinder carrying stops or pins, which by their position act upon the said releasing device at required intervals of time by and through the rotation of the cylinder to throw the pinion D into action, substantially as described.

5. In combination with the pinion D, the continuously-running gear 3, time-cylinder A, connecting-gearing, reversible intermediate gears 5 6 7, reversing mechanism adapted to change the working positions of the said gears, as described, at the end of each longitudinal travel of the cylinder along its shaft and operated at such times by stops on the ends of said cylinder, means by which the said pinion is thrown and held out of action, and a releasing device adapted to be actuated by time-pins on the cylinder through the movement thereof on its shaft to release said pinion and throw it into gear at given intervals of time, substantially as described, for operation as set forth.

In testimony that we claim the foregoing we have hereunto set our hands and seals.

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