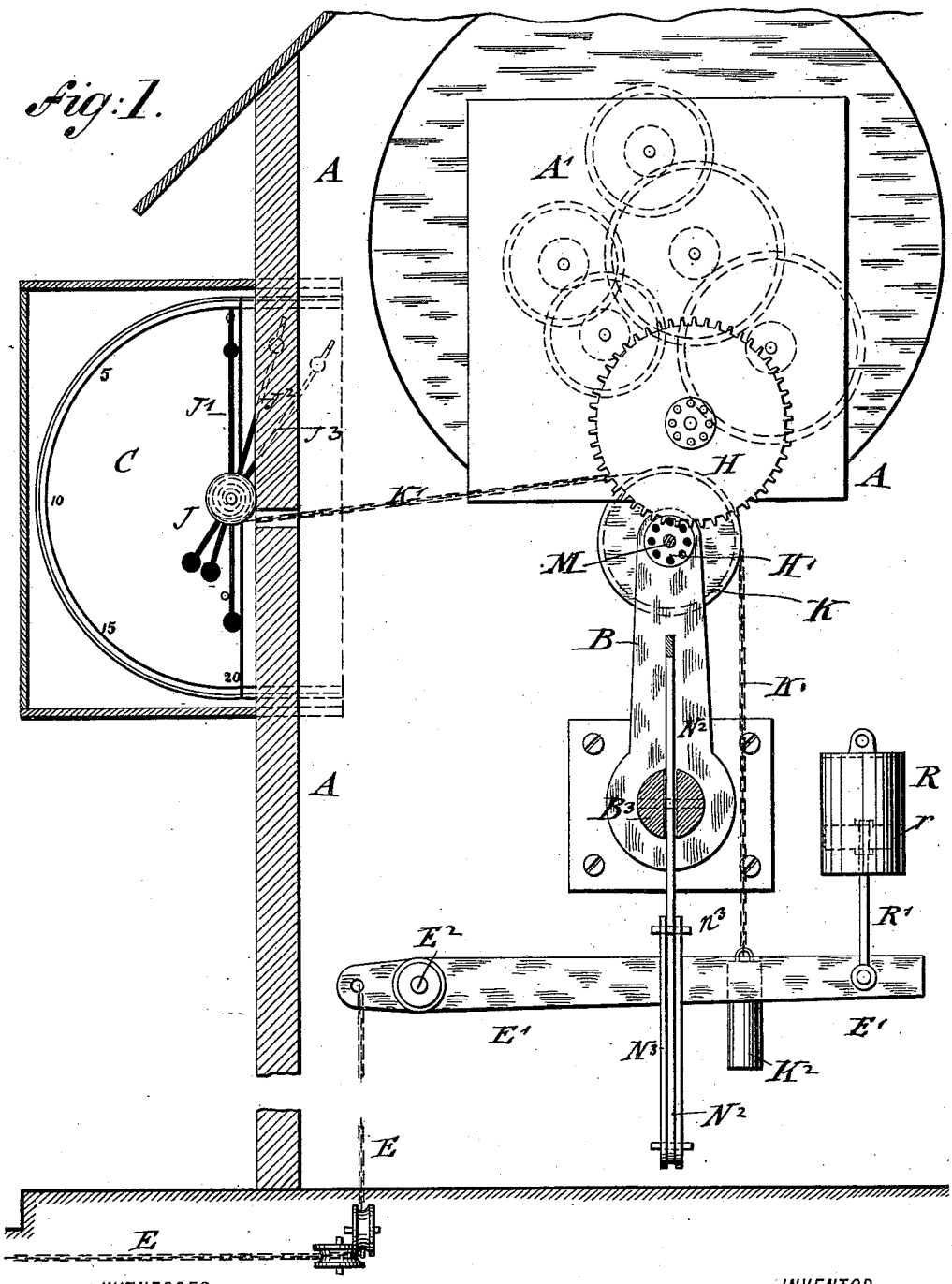
(No Model.) 2 Sheets—Sheet 1.

H. GOSMAN.

RAILWAY TIME SIGNAL.

No. 470,821. Patented Mar. 15, 1892.

Fig. 1.



WITNESSES:

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Charles Schroeder

INVENTOR

Harry Gosman

BY

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ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

H. GOSMAN.

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Fig. 4.

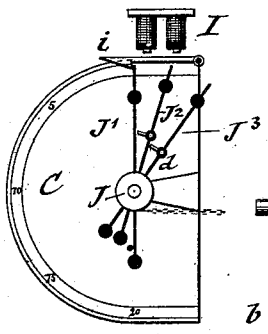


Fig. 2.

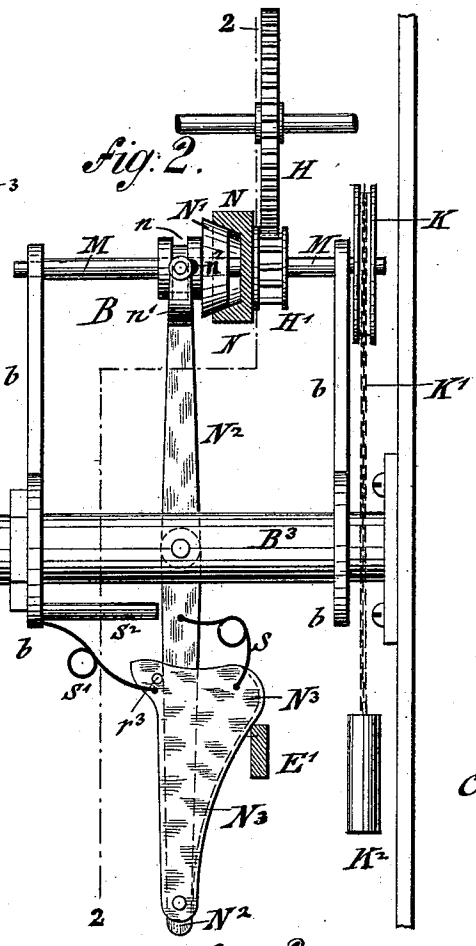


Fig. 6.

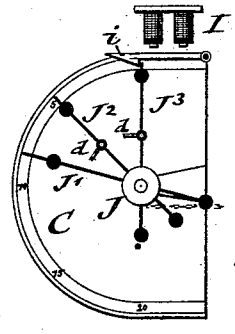


Fig. 5.

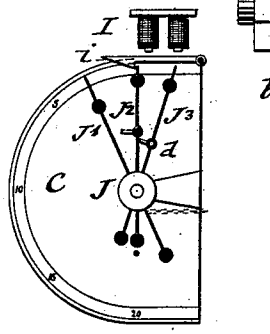


Fig. 7.

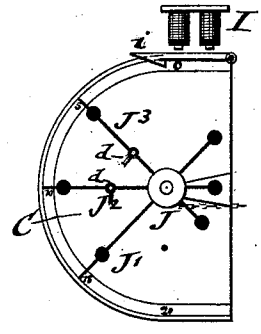


Fig. 3.

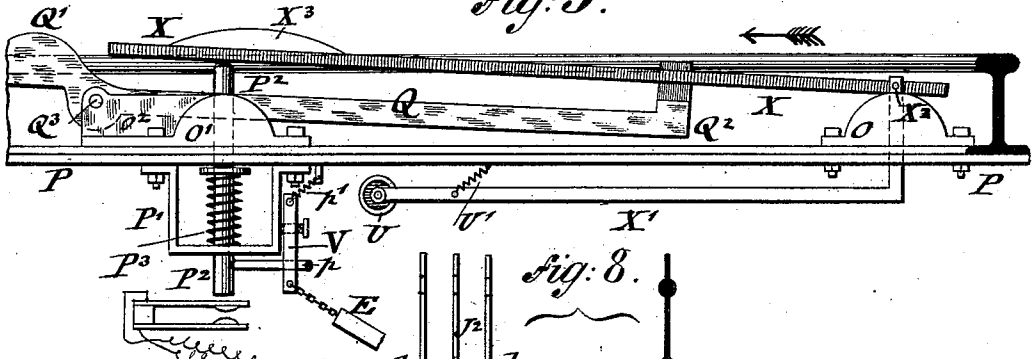
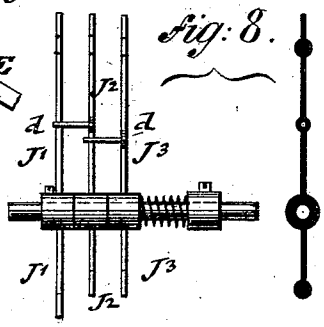


Fig. 8.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HARRY GOSMAN, OF WATERTOWN, NEW YORK.

RAILWAY TIME-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 470,821, dated March 15, 1892.

Application filed May 23, 1891. Serial No. 393,832. (No model.)

To all whom it may concern:

Be it known that I, HARRY GOSMAN, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Railway Time-Signals, of which the following is a specification.

This invention relates to certain improvements in the railway time-signal for which I made an application for Letters Patent, Serial No. 359,363, filed July 21, 1890, whereby the time-signal is adapted for single-track railways and arranged in such a manner that the minute-dial is arranged with two or more hands that are at certain intervals of time permitted to move over the dial, so as to indicate the position of the train at different points on the the track, and in which, when any part of the connection between the signal-actuating lever alongside the rail and the index-hand on the signal-dial should break, the hands will go back to zero or the danger-point and remain there, so as to give the necessary warning.

The invention consists of a railway time-signal, which comprises a minute-dial with several index-hands located at the station or other point on the track, a clock in the station by which the hands on the said dial are operated, an intermediate hand-setting device between the clock and the dial, a signal-actuating lever applied sidewise of the rail and actuated by the locomotive, and chains or rods connecting said lever with the hand-setting device operated by the clock, said signal-actuating lever and the hand-setting device returning the index-hands to zero by the action of a passing train.

The invention consists, secondly, of certain details in the construction of the hand-setting device, whereby the friction-clutch connection between the clock and the transmitting mechanism between the clock and the dial is operated in a very reliable and effective manner, and, lastly, of certain improvements in the signal-actuating mechanism located alongside of the rail, whereby the lever of the same, when once depressed by the wheels of the locomotive, is moved laterally out of contact with the wheels of the remaining cars of the train, so as to protect it against too rapid wear, said actuating-lever being returned into normal position by a suitable mechanism after the train has passed, as will be fully set forth hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a vertical transverse section of a portion of the station-building, showing my improved railway time-signal in position on the same and its connection with the station-clock, also the connection of the time signal and clock with the chain leading to the signal-actuating lever alongside of the track, a portion of the hand-setting mechanism being drawn in section on line 2 2, Fig. 2. Fig. 2 is a sectional side elevation of that part of the hand-setting mechanism introduced between the station-clock and the minute-dial drawn on a larger scale. Fig. 3 is a side elevation of the signal-actuating lever and its operating mechanism located alongside of the rail for returning the hands of the time-signal to zero. Figs. 4, 5, 6, and 7 are details of a minute-dial with three hands operated, which are successively started and moved over the dial, so as to indicate the position of the train at different points on the track; and Fig. 8 is a detail side view showing the arrangement of the index-hands on the spindle of the spring-barrel of the dial.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a railway-station or other building near the track, A′ the station-clock, and C a minute-dial which is placed outside of the station-building and either attached to the same or to a post or other support near the station-building, so that it may be readily and conveniently seen by the engineers of passing trains. Between the minute-dial C and the station-clock A′ is introduced a hand-setting device B, which is supported by a frame B′, that is attached to the wall back of the casing of the clock, as shown in Fig. 2. The hand-setting device B is made independent of the clock, so as to be readily applied to the same. It consists of a friction-clutch N N′, the member N of which is placed loosely on an arbor M, that is supported in bearings *b b* of the frame B′. To the loose member N of the friction-clutch is attached a pinion H′, which is in mesh with a transmitting gear-wheel H of the

clock-train A′. The hub of the second member N′ of the friction-clutch is splined to the shaft M, so as to turn with the same, but be adapted to slide thereon. The member N′ is provided with an annularly-grooved hub *n*, that is engaged by the forked end *n′* of a lever N^2, which is fulcrumed to the main post B^3 of the frame B. To the lower end of the lever N^2 is pivoted a cup-shaped sleeve N^3, which is open at the rear end, which extends around the lower end of the lever N^2. The upper end of the sleeve N^3 is connected by a transverse pin n^3, which prevents the sleeve N^3 from dropping off the lever N^2. The upper front part of the sleeve N^3 is connected by a spring S with the lever N^2, while a second spring S′ connects the upper rear part of the sleeve N^3 with the frame B. A stop-pin S^2, attached to the lower part of the post *b*, serves to arrest the motion of the lever N^2. A lever E′ is arranged transversely to the sleeve N^3 and fulcrumed at E^2 at some distance from the sleeve N^3, the shorter end of the lever E′ being connected by a chain or cord E with a signal-actuating lever X, that is located alongside of the rail. The opposite end of the lever E′ is connected by a piston-rod R′ with a piston *r*, located in an air-cushioning cylinder R, by which the upward motion of the lever E′ is checked. The lever E′ is held in contact with the sleeve N^3 when in a normal position of rest—that is to say, when no train is passing the station. In this position it keeps the friction members N and N′ firmly together, so that the fixed member N′ is compelled to turn with the loose member N. On the arbor M is mounted a pulley K, the grooved circumference of which serves to guide a chain or cord K′, that is connected to a spring-barrel J, to the arbor of which more index-hands are applied, which are moved over to the minute-dial C by the action of a clock-train and the intermediate hand-setting device. A weight K^2 at the opposite end of the chain K′ serves, in connection with the clock-train, to move the index-hands over the dial, which hands are returned to zero at the moment when the members of the friction-clutch are disconnected, as the tension of the spiral spring in the barrel J overcomes the counteracting tension of the weight K^2. The minute-dial C is formed of a segment of a circle and graduated in a plain and distinct manner from five minutes upward. The spiral spring in the spring-barrel J is set to tension by the weight K^2 and the action of a clock-train, so that the index-hands are moved over the dial when the members of the friction-clutch are in mesh and the hand-setting device is operated by the clock-movement. When a train is passing, the lever E′ is dropped by the action of the intermediate mechanism, so that the lever N^2 is oscillated by the action of its spring S′, and the members of the friction-clutch are separated, so that the index-hands are moved back to zero by the action of the spring-barrel J, which overcomes the counter-tension of the weight K^2. As soon as the train has passed the station the lever E′ is returned to its normal position in contact with the sleeve N^3 by the return motion of the signal-actuating lever alongside the rail and the action of the springs of the same on the connecting cord or chain E. It appears from the foregoing that the connection between the shaft M and the spring-barrel of the minute-dial, as well as the connection between the levers N^2 and E′, with the signal-actuating mechanism alongside the rail, is so made that the working of the clock-train moves the hands over the dial, while in case of a break of the connections between the shaft M and the spring-barrel J, or between the lever operating the friction-clutch and the signal-actuating mechanism alongside the rail, the hands will by the action of the spring-barrel J immediately go back to the zero-point or, in other words, to the danger-point of the dial.

On the arbor of the spring-barrel J are arranged one, two, or three hands, as the service may require. The hand J′ is made fast to the arbor, while the hands J^2 and J^3 are only attached loosely to it and made to go with it by the friction. There is a stud connection *d d* between the hands J′ and J^2 and J^2 and J^3, as shown in Fig. 8, which connection is so arranged that when they are in a position of rest at zero on the dial they assume the position shown in Fig. 4. When the train has passed the station five minutes, the hand J′ has advanced over the dial and indicates five minutes thereon, while the hand J^2 is detained at the zero-point by a beveled catch *i* on the armature of an electro-magnet I, that is located near the zero-point of the dial, as shown clearly in Figs. 4 to 7, and operated by electric contacts arranged alongside of the track at suitable distance from each other. When the train reaches the station, a contact is closed near the signal-operating lever, so that the armature is attracted by the electro-magnet I and the hand J′ permitted to move over the dial C. When the train reaches the next contact-point along the track, the circuit is again closed, the armature attracted, and the hand J^2 released, so that it can follow after the hand J′. The hand J^3 now moves up until it is stopped by the catch of the armature, it being also released when the train reaches the next contact-point farther on along the track, so that the circuit is again closed and the armature attracted; whereby the hand J^3 is released in the same manner as the hand J^2 and permitted to follow the other hands in their motion over the dial. Assuming that the electric contact for the hand J^2 be two miles from the station and for J^3 four miles, then the position of the hands when the train has just passed the station is indicated in Fig. 4, while Fig. 5 shows the position of the hands after a train has left the depot three minutes ago, but has not reached the two-mile point yet. Fig. 6 shows the position of the hands when the

train has passed the two-mile point five minutes, but before it has reached the four-mile point, and Fig. 7 shows the position of the hands when the train has passed the depot fifteen minutes ago, the two-mile point ten minutes ago, and the four-mile point five minutes ago. If a train should reach and pass the depot before the first train has reached either of the two points ahead, the hand J′ will return to zero and thereafter designate the position of the last train—to wit, the train that has just passed. When the hand J′ reaches the twenty-minute mark, it is stopped in its onward course, as the fork n' of the lever N^2 enters into diametrical recesses n^2 at the right-hand side of the groove of the hub n', as shown in Fig. 2, whereby the frictional contact of the member N′ with the loose member N of the clutch is discontinued and the index-hand J′, together with the hands J^2 and J^3, are stopped and retained in their relative positions on the dial. The stop s^2 prevents the fork n' from dropping too far into the recesses n^2. When a train arrives at the station, the signal-actuating lever is operated and the index-hand J′ is returned to zero, it commencing then its forward motion again, which is followed by the auxiliary index-hands J^2 and J^3 as they are released successively by the passage of the train over the two and four mile contact-stops, respectively.

The chain or cord E is connected with a pendulum-lever V, that is arranged below the rail and pivoted to a hanger P′. This pendulum-lever V is operated whenever the signal-actuating lever X is operated. The lever X is provided at its upper end with a convex part X^3, that extends above the top of the rail, its lower end being swiveled at X^2. The lever X is so swiveled that its upper end can have two motions—a downward one and a lateral one—away from the rail. To the base of the rail is clamped a bed-plate P by means of clamps o o'. To the swiveled end of the lever X is applied an L-shaped arm X′, which extends under the bed-plate and has only the lateral motion with the lever X. The swivel X^2 is made of a round bolt with square ends, and thereby the connection of the members X and X′ through the clamp o. Below the lever X is arranged a second inclined lever Q, that is fulcrumed at Q^3 to a vertical flange o^2 of the clamp o', as shown in Fig. 3, and provided with a shoulder Q^2 at its lower end between the lever X and the rail, while the upper end of the lever Q has a convex portion Q′, that extends above the top of the rail, so that an up-and-down motion is imparted to the lever Q only by the action of the wheels of a train passing over the same. Below the upper end of the lever X is arranged a spring-actuated plunger P^2, that passes through the clamp o' and is guided in a U-shaped hanger P′, between which and the shoulder on the plunger is arranged a spiral spring P^3, which is stiff enough so as not only to raise the plunger P^2 and the lever X to the required height, but also to prevent the plunger P^2 from being too easily pressed down. To the lower end of the spring-actuated plunger P^2 is applied a pin p, that engages the pendulum-lever V, so that it is moved by the up-and-down motion of the plunger P^2. A spring p' is attached to the upper end of the pendulum-lever V and returns the same after the plunger P^2 is lifted again, so that when the pendulum-lever is returned into its normal position the rod or chain E is pulled taut, and thereby the lever E′ returned into its normal position. The too-quick motion of the lever E′ is prevented by its air-cushioning cylinder and the piston on the piston-rod connected to the lower end of the lever E′. At the end of the arm X′ is arranged an air-chamber U, that serves to retard the return of the arm X′ after it has been pushed away from the side of the rail in the same manner as the motion of the lever E′ is retarded by its air-cylinder, while a spring U′, connected to said arm and the base-plate P, serves to pull back the arm X′ to the side of the rail. When a train passes over the track in the direction of the arrow, (shown in Fig. 3,) one of the wheels of the locomotive presses down the convex part X^3 of the lever X, which latter again presses down the plunger P^2, which moves the pendulum-lever V and relieves thereby the tension of the chain E, so that the longer end of the lever E′ is permitted to drop, by which motion the members of the friction-clutch are separated and the hands on the minute-dial move back to zero by the action of the spring in the spring-barrel J. Immediately after the wheel of the locomotive has left the part X^3 it presses down the convex part Q′ of the lever Q and forces the shoulder Q^2 at the lower end of the lever Q upward between the lever X and the web of the rail, so as to force the lever X and the arm X′ away from the rail. As the spring U′ has a tendency to pull the arm X′, and thereby the lever X, quickly back into its former position, the air-chamber U is arranged to check this motion and permit the arm X′ to return slowly, so that all the remaining wheels of the train can pass over the rail without touching the lever X, as the same is kept away from the rail all the time by these successive depressions of the lever Q. By this arrangement the wear of the lever X by the action of the wheels of the train is prevented, and any action on the hand-setting mechanism entirely dispensed with. If the train, however, passes in an opposite direction over the track, the forward wheels of the locomotive touch and press down the end of the lever Q first, so that the lever X is moved sidewise without being actuated by the train and without interfering with the hands on the dial. The lower end of the plunger p^2 is preferably used for making an electric contact when located at a given point, so as to close the circuit with the electro-magnet I, whereby the armature is attracted and the hand J^2 released from the catch E and permitted to

move over the minute-dial C. The electric connections of the electro-magnet with the different contact-points alongside of the track are simple and effective, only one wire and one electro-magnet and armature being required for operating two or three hands, as the service requires.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a clock-train, a minute-dial supported near the track, index-hands on said minute-dial, an intermediate hand-setting mechanism actuated by the clock-train and connected to said index-hands, a fulcrumed lever engaging the hand-setting device and provided with a spring-actuated sleeve at its lower end, a fulcrumed lever placed in contact with said sleeve, a signal-actuating mechanism arranged alongside of the rail of the track and adapted to be actuated by a passing train, and an intermediate chain or rope connection between the signal-actuating mechanism and the sleeve-actuating lever, so as to permit the disconnection of the hand-setting device with the clock-train and the returning of the index-hands to zero by the action of the passing train, substantially as set forth.

2. In a railway time-signal, the combination, with a minute-dial, of a spring-barrel operated by the hand-setting device, an index-hand keyed to the arbor of said spring-barrel, additional hands applied loosely to said arbor and working by friction with the same, a stop connection between said hands to hold them at some distance from each other, an armature having a catch for engaging the outer ends of said hands, and an electro-magnet for operating said armature, said electro-magnet being placed in circuit with contacts alongside of the track at suitable distance from each other, so as to permit the successive movement of the hands over the minute-dial as the train closes the contacts along the track, substantially as set forth.

3. In a railway time-signal, a signal-operating mechanism arranged alongside of the rail and composed of a primary lever adapted to move vertically along the rail and laterally away from the same, an auxiliary lever fulcrumed alongside of the rail, also actuated by the wheels of the train and adapted to move said primary lever in lateral direction, and means operated by the primary lever, whereby the chain connecting the actuating mechanism with the hand-setting mechanism is slackened, substantially as set forth.

4. In a railway time-signal, a signal-actuating mechanism composed of a primary lever located alongside of the rail and extended at one end above the same, a spring-actuated and cushioned arm connected to said lever, an auxiliary lever fulcrumed to the rail and adapted to engage the primary lever, so as to move the same laterally away from the rail, a spring-actuated plunger operated by the primary lever, a spring-actuated pendulum-lever connected to the chain or cord that leads to the hand-setting device, and a pin on said plunger for actuating said pendulum-lever so as to slacken the chain or cord and permit the return of the hands to zero by the operation of the hand-setting device, substantially as set forth.

5. The combination of a clock-train, a mounted dial supported near the track, an index-hand or index-hands on said minute-dial, an intermediate hand-setting mechanism actuated by the clock-train and connected to said index hand or hands, a spring-barrel for returning the index hand or hands to their initial positions, a signal-actuating mechanism alongside the rail of the track and composed of a primary lever adapted to be moved in a vertical and in a lateral direction and of an auxiliary lever by which the lateral motion is imparted, and a chain or cord connection between the signal-actuating mechanism and the hand-setting mechanism, which mechanism is operated by the primary lever only by a train passing in one direction over the track, so as to first depress the primary lever, substantially as set forth.

6. The combination of a clock-train, a minute-dial supported near the track, an index hand or hands on said minute-dial, a spring-barrel for returning said index hand or hands, an intermediate hand-setting mechanism actuated by the clock-train, a friction-clutch, the fixed member of which is provided with a grooved hub having recesses, a fulcrumed lever for engaging said fixed member, a signal-actuating mechanism arranged alongside of the rail of the track, and an intermediate chain or rope connection between said signal-actuating mechanism and the fulcrumed lever, so as to produce the return of the index hand or hands to their initial positions by the action of the passing trains, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HARRY GOSMAN.

Witnesses:
D. G. GRIFFIN,
THOMAS BURNS.