(No Model.) 3 Sheets—Sheet 1.

P. LONG & W. S. TURNEY.

RAILWAY SIGNAL.

No. 276,254. Patented Apr. 24, 1883.

Fig. 1.

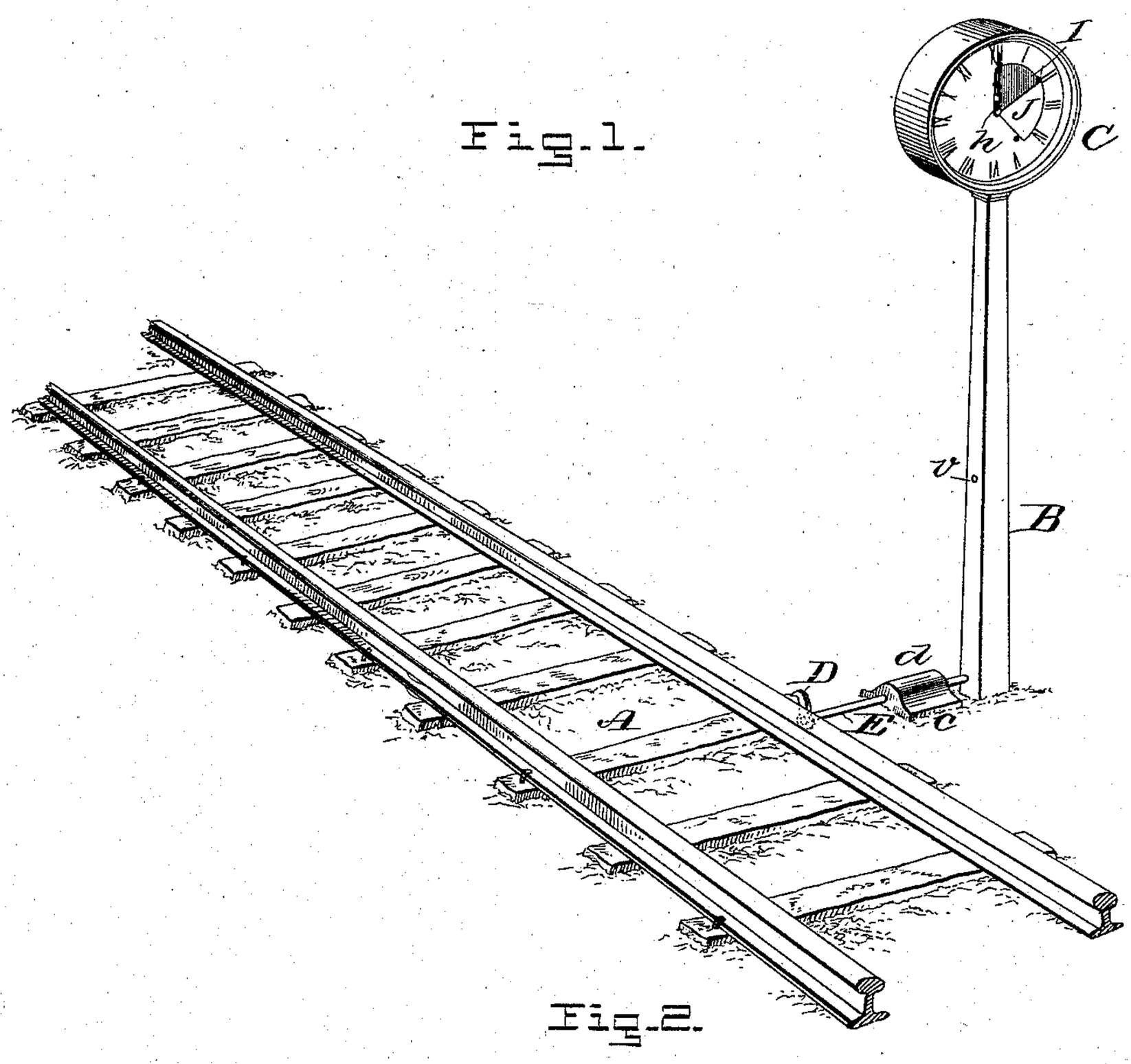
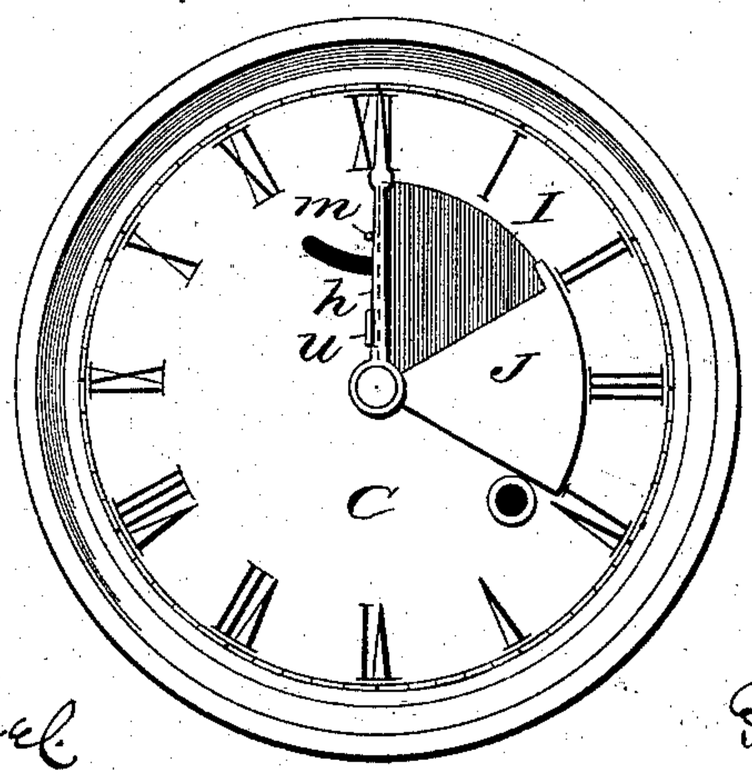


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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Fig-3.

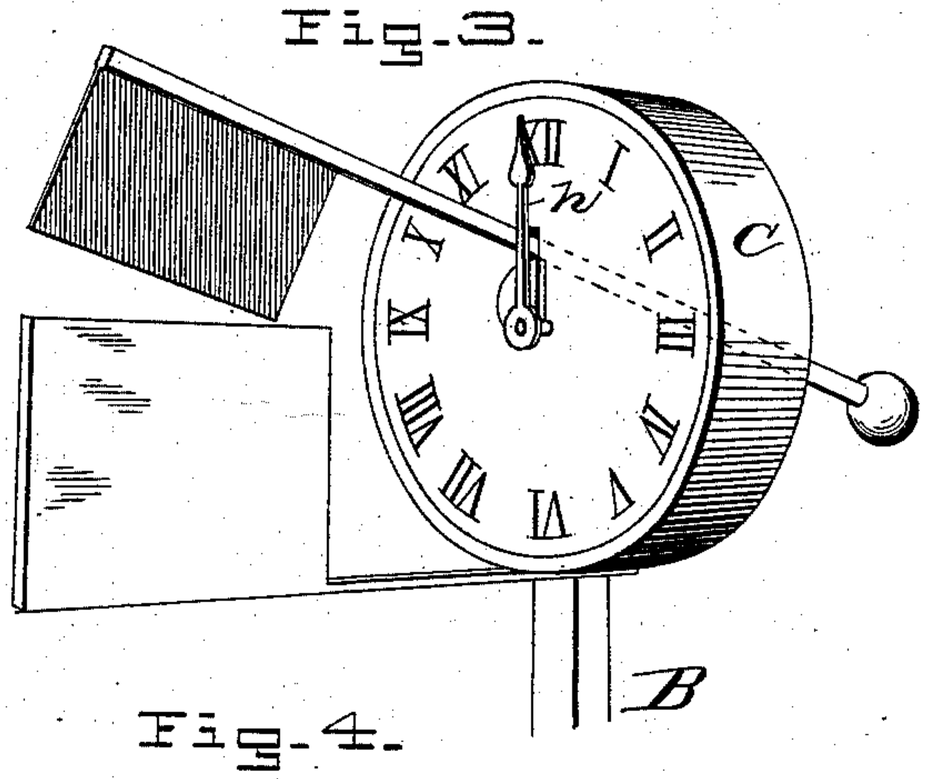


Fig-4.

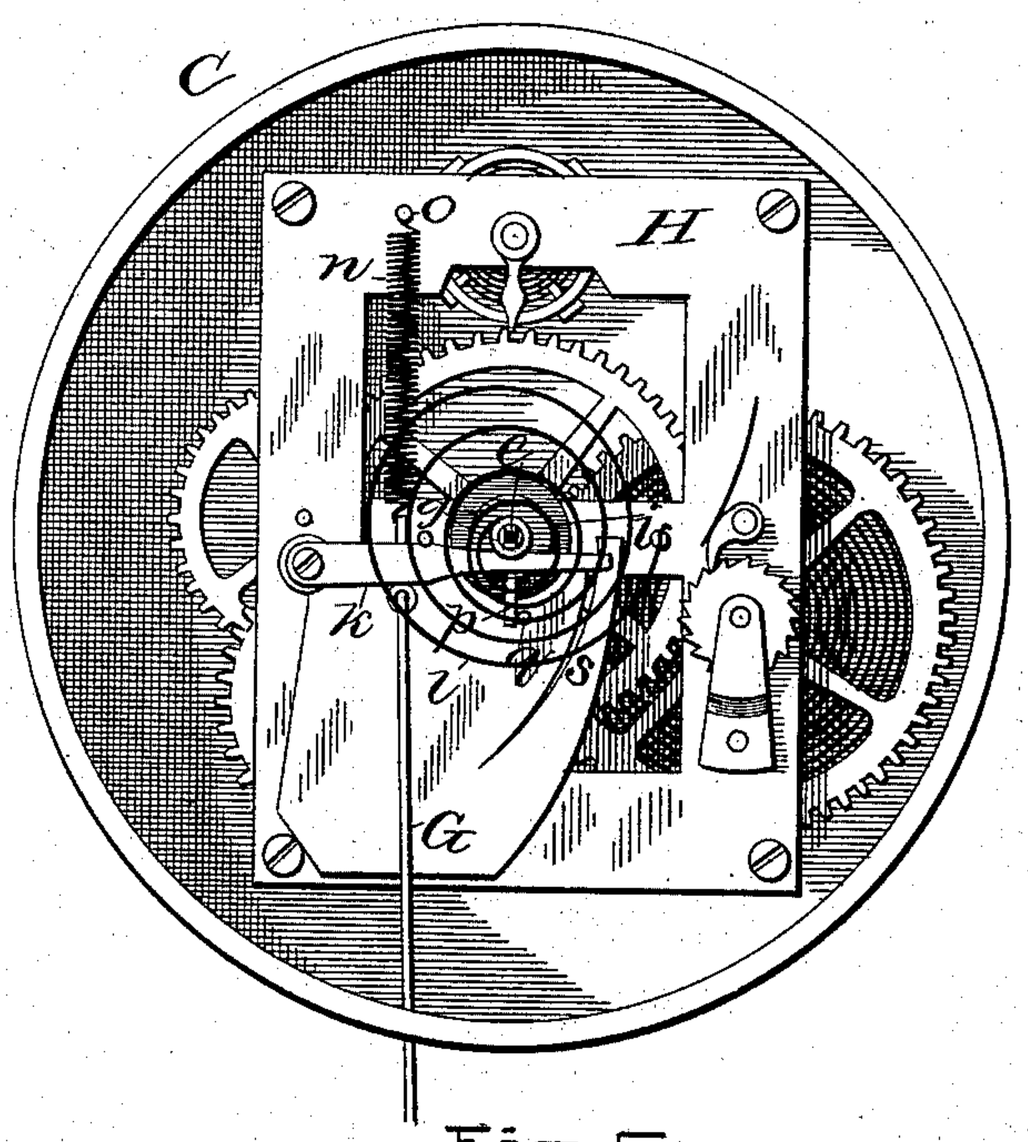
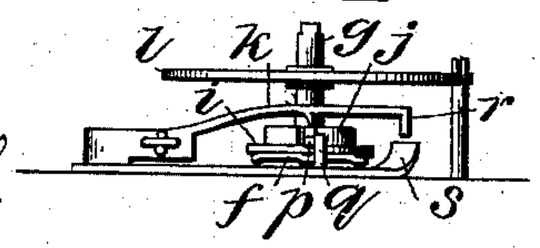


Fig-5



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RAILWAY SIGNAL.

No. 276,254. Patented Apr. 24, 1883.

Fig. 6.

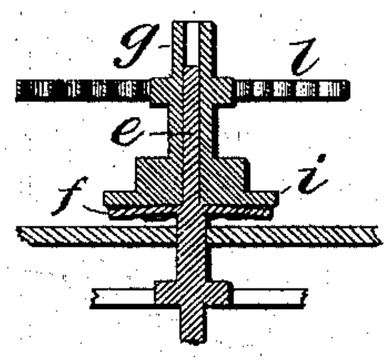


Fig. 7.

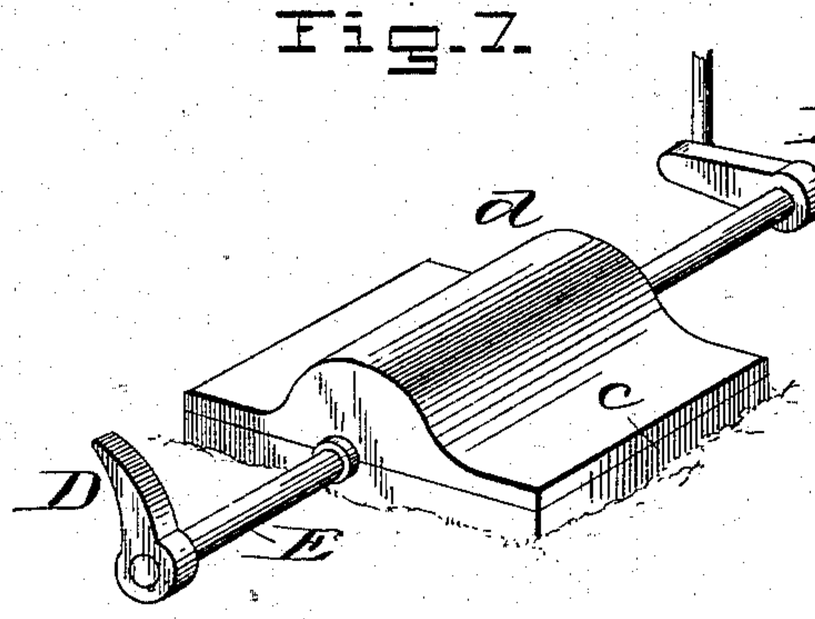


Fig. 8.

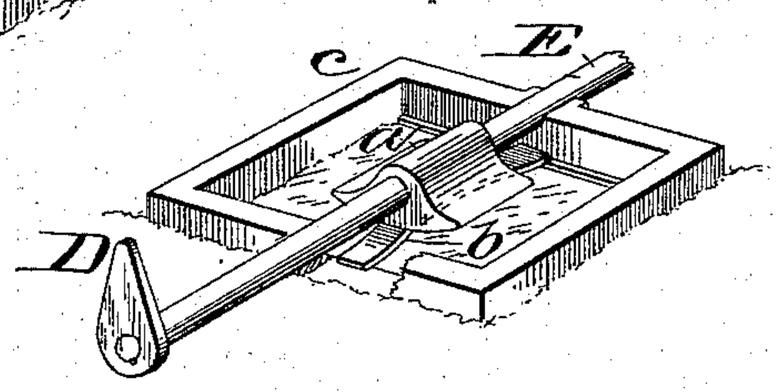


Fig. 9

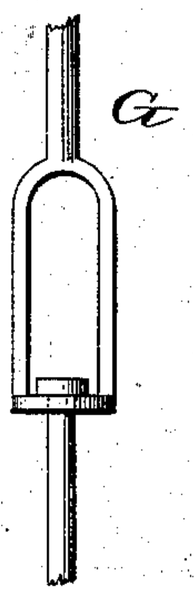
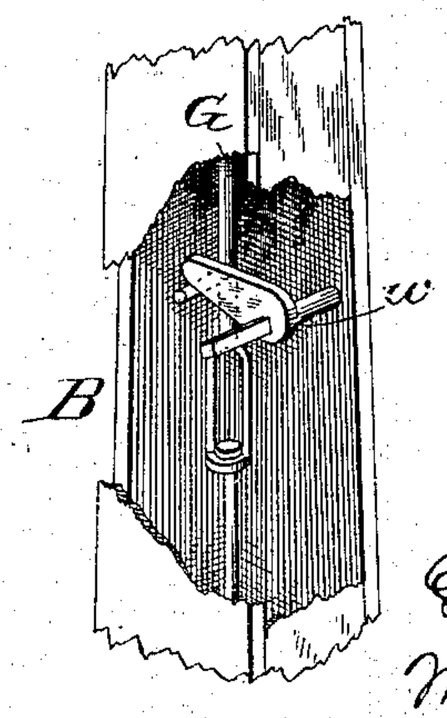


Fig. 10.



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UNITED STATES PATENT OFFICE.

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RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 276,254, dated April 24, 1883.

Application filed December 12, 1882. (No model.)

To all whom it may concern:

Be it known that we, PETER LONG and WILLIAM S. TURNEY, of Greensburg, in the county of Westmoreland and State of Pennsylvania, have invented certain Improvements in Railway-Signals, of which the following is a specification.

Our invention relates to railway-signals adapted to be set or displayed through the agency of a passing train; and it consists in various features and details hereinafter fully explained.

In the accompanying drawings, Figure 1 represents a perspective view of a short section of roadway, showing our improved apparatus in position; Fig. 2, a face view of the signal and time mechanism enlarged; Fig. 3, a view showing the signal in a form suitable for railway use; Fig. 4, a face view of the time mechanism and signal-setting mechanism, with the dial-plate removed; Figs. 5 and 6, views illustrating the manner of releasing or disconnecting the time-indicating hand from the clock-train and causing it to act upon the signal; Figs. 7, 8, and 9, views illustrating the trip mechanism operated by the train; Fig. 10, a view showing the sliding joint of the connecting-rod and manual setting devices.

Our invention is designed to show to the engineer or conductor of a following train the precise length of time that may have elapsed since the passing of the preceding train up to a given time thereafter, which time will be sufficiently long to insure a safe distance between trains; and in order that there may be no chance of mistake on the part of the engineer or conductor of the second or following train, we provide for displaying for a stated length of time of a danger-signal.

Referring now to the drawings, our invention will be explained; but it should be stated here that we do not confine ourselves to the precise construction and arrangement of mechanism herein shown and described, as the same principle may be embodied in a variety of forms of apparatus, the essential features being the display for a predetermined length of time of the signal and its removal at the end of that time, and in the use of a time-indicating mechanism in connection with the signal to show when it was last displayed.

A represents a section of track, by the side of which is placed a post or support, B, bearing at a suitable height a time and signal mechanism, C, controlled, as hereinafter explained, by passing trains, through the medium of a lever, D, mounted beside the track and close to one of the rails on a rock-shaft, E, provided with a crank, F, which connects with the signal mechanism through a jointed rod, G, capable of sliding together or telescoping, in order that it may operate the signal-releasing devices only when pulled down.

Upon the rock-shaft E is secured a cam, *a*, which bears upon a spring, *b*, which spring is designed to be of sufficient strength to hold the arm or lever D of the rock-shaft in the position shown in Figs. 1 and 7, against a pressure of from two to three hundred pounds or more applied to said lever, in order that the latter may not be depressed by persons treading upon the same.

In practice it is intended that the spring *b* and the working-face of cam *a* shall both be below the level of box or casing *c*, in which the spring is seated, the box in such case serving as an oil-receptacle, the presence of the oil answering to prevent rusting and to insure the easy working of the parts. The casing or box *c* will be provided with a cap, *d*, to exclude dirt, snow, rain, &c., and to prevent parties from meddling with the spring or cam.

When the apparatus is employed for double-track roads there will be one apparatus for each track; but where a single track is used the two signaling devices will be applied to opposite sides of the same track, in which latter case the lever D should be in the form shown in Fig. 8, and arranged to stand upright, so that it may be moved either way, according to the direction of the train, though serving to operate the signal mechanism only when moved in one stated direction. This will be understood by referring to Figs. 1 and 9, where it will be seen that rod G, by which the movements of lever D, rock-shaft E, and crank F are transmitted to the signal-controlling mechanism, is provided with a loose sliding joint, so that when crank F is elevated it simply raises the lower section of the rod without affecting the upper section; but if the crank-arm be moved down it draws upon the rod,

and the two parts moving together operate the signal releasing or setting devices.

Referring now to Figs. 2, 3, 4, 5, and 6, the signal mechanism proper will be explained. C represents the mechanism as a whole, consisting of a time-movement, H, of any ordinary or suitable construction, having the customary center-post, *e*, but without the usual squared end. The center-post is provided with a friction-disk, *f*, which may be milled or roughened, if desired, or left smooth, if preferred, and is encircled by a tubular sleeve, *g*, which carries the hand *h*, by which the time is marked on the dial, the time being marked preferably in minutes. The sleeve or tubular stem *g* is furnished with a friction-disk, *i*, to bear upon and receive motion from the first-mentioned disk, *f*, and it is also formed with a hub or collar, *j*, to form a bearing-surface for a spring-arm, *k*, by which the two disks are pressed together with sufficient force to insure the rotation of disk *i* with and by disk *f*, such frictional contact or engagement of the two disks forming the only connection between the impelling-train of the time mechanism and the hand or indicator *h*, driven thereby.

Attached to and coiled about the tubular sleeve *g* is a spring, *l*, which will in practice be of considerable strength, though materially lighter and weaker than the driving-spring of the time-movement, because the operation of the train or time mechanism by the main driving-spring serves to coil or wind up the secondary spring *l*, one end of which is attached to sleeve *g*, as above stated, while the other end is made fast to a fixed post.

The time-movement, being wound and set in motion, rotates the sleeve *g*, as above explained, and coils or winds up the spring *l*, this action continuing, unless interrupted by the passing of a train, until the hand *h*, carried by said sleeve, comes in contact with a stop, *m*, (shown in Fig. 2,) when the mechanism stops, leaving the spring *l* coiled or wound up and under considerable compression. If, now, the pressure of spring-arm *k* be removed from hub *j*, the friction between disks *f* and *i* would be destroyed and the sleeve *g* would be rotated backward through the tendency of spring *l* to unwind or straighten out, and, in thus rotating, the sleeve would carry backward the hand or indicator *h*. This release or retraction of arm *k* is effected by the drawing down of rod G, the arm being pivoted at one end, and the rod G being connected with the arm, as shown, so that as the wheels of a train pass over the arm or lever *a* the arm *k* will be drawn down off of hub *j*, though it is returned to its normal position after the passage of the train by a spring, *n*, one end of which is attached to the arm *k* and the other end to a fixed stud or post, *o*, as shown in Fig. 4. The rotation of sleeve *g* in either direction is limited by an arm, *p*, with which it is provided, coming into contact with a stop-pin, *q*.

In order that the spring-pressure arm *k* may properly press the disks *f i* together, yet freely ride over and upon the hub *j*, its end is formed with a bearing-lip, *r*, which rests upon an incline, *s*, which serves to hold the arm *k* up off of and above the hub in passing over the edge of the same, but terminates or sinks to permit the arm to bear upon the hub and clear the incline just after passing over the edge of said hub.

I represents a signal-plate, which may be opaque or transparent, and, if the latter, may be made to move over or in front of a fixed light; or it may be lighted by reflected light, both of which plans are common and therefore need no explanation. The plate I is shown in Fig. 2 as formed with a hole or eye at one end, fitting loosely around the sleeve *g* and turning or swinging freely about said sleeve as a center or pivot, the plate being so formed or adjusted that its center of gravity falls always at one side of its pivotal center, so that the plate shall fall by reason of its own weight when not held up by the clock-hand *h*, as presently explained.

J is a sheath or guard behind which the signal-plate I falls, and by which it is hidden from view. In practice, the plate I will be painted or colored red, or whatever color is adopted by the road as a danger-signal, and the shield or guard J will be given the color of the safety-signals.

The operation of the device is as follows: Assuming that the time mechanism has been wound, the hand *h* will be moved backward to the mark or numeral XII, or the starting-point, and in being thus moved will strike a lip or ear, *u*, on the plate I, and consequently carry said plate upward from behind the guard or shield and present it to view. The time mechanism then runs on, and just as the hand *h* moves forward, the signal-plate I descends behind its shield or guard, the lip or ear *u* of said signal-plate bearing against the hand, and thus preventing the signal from falling, except as the hand moves before the ear or lip and permits the weight of the signal-plate to carry it down.

In the drawings we have shown the upper edge of the shield or guard placed a distance from the starting-point or "twelve" mark equal to ten minutes on the dial-plate; hence the signal would remain in view ten minutes, and would then be hidden; but, instead of ten minutes, a longer or a shorter time may be adopted. As the signal-plate passes out of sight behind the guard or shield J its movement is arrested by the latter; but the hand *h* continues to travel forward until the next train arrives, or until arm *p* reaches the stop *q*, which latter would be at the end of fifty-five minutes with the dial marked as shown. The time may be made longer or shorter, as required, by increasing or diminishing the divisions or markings on the dial and regulating the clock-train and escapement accordingly. The engineer and conductor of a second train

can thus ascertain the precise length of time elapsed since the passage of a preceding train at the same point by simply looking at the clock, unless such time exceeds the fifty-five minutes or other limit given to the clock, and if the trains are less than ten minutes apart they will also be warned by the danger-signal I.

The apparatus will of course be made sufficiently large and strong to operate and display signals of ordinary size and form; but to enable them to be operated with the least practicable amount of power they will be nearly balanced by counter-weights, springs, or other well-known means.

In Fig. 3 the signals are shown as arranged to operate at right angles to the face of the clock or time mechanism—a plan that will be found advantageous in practice in some places. If fifty-five minutes, or such other time as may be adopted as a limit, shall have expired before the arrival of the second train, the engineer will know that the road is clear, and if less time has elapsed he will know how to regulate the speed of the train, because informed of the time exactly. The second train, passing over the lever D, draws down the spring-arm *k*, as before explained, permitting spring *l* to carry the hand *h* back to "twelve" and to raise the signal for the next train, the hand *h* traveling again forward and indicating the time of departure of the preceding train to the one next arriving, as in the first instance.

In order that the signal may be set by flagmen or other employés of the road, we provide the post or box B with a hole or opening, *v*, through which a switch-key or other instrument may be inserted to turn an arm, *w*, which, acting upon rod G, causes the signal to be displayed.

It is obvious that any form of motor may be employed, and that weights may be substituted for springs; also that a sliding collar moved by an elbow-lever or equivalent means may be substituted for the arm.

Having thus described our invention, what we claim is—

1. In combination with a signal mechanism substantially such as shown and described, a lever located by the side of the track, and adapted to be moved by and in the direction of a passing train, and a rod or connection between the lever and the signal mechanism, provided with a sliding joint, whereby a train passing in one direction is caused to operate the signal mechanism, but a train in the opposite direction is prevented from actuating the same.

2. In combination with a signal mechanism, substantially such as shown and described, a rock-shaft provided with an upright lever to be moved by a passing train, with a crank-arm to actuate the signal-controlling devices, and with a cam or block, and a flat spring placed beneath the block and adapted to retain the lever normally in position to be struck by a passing train, whereby the rock-shaft is permitted to turn in either direction according to the direction of the train, and is caused to return to an upright position after movement in either direction.

3. In combination with a signal mechanism substantially such as described and shown, a rock-shaft provided with a lever to be actuated by the wheels of a passing train, and with a cam or block, a spring placed beneath said cam or block, and a case or box adapted to contain the spring and to hold a supply of oil above the top of the spring.

4. In combination with a clock or time movement provided with a spindle bearing a friction-disk, a second friction-disk arranged to bear upon and to be moved by the first, a sleeve attached to said disk and bearing a hand or indicator, and a gravitating signal adapted and arranged to be held up by the hand until the latter travels beyond a given point.

5. In combination with a hand or indicator of a time mechanism, a signal-arm overhanging said hand and supported thereby, substantially as shown, a shield and a stop arranged in the path of the signal-arm, whereby the signal-arm is held up by the hand until the signal passes behind the shield and the arm strikes against the stop, while the hand continues its forward movement, substantially as and for the purpose explained.

6. In combination with a time-movement having its time-indicating hand connected with the impelling mechanism by friction-disks, and arranged to elevate and support a signal, a movable arm arranged to be moved to or from one of said friction-disks, substantially as explained, and to produce or destroy the frictional contact between them, and a lever arranged by the side of the track and connected with said arm.

7. In a signaling device, the combination of a motor provided with a clutch, hub, or disk, a second disk bearing a hand or indicator, and provided with a spring arranged to operate in the opposite direction to the motor, a signal-bearing arm overhanging the indicator-hand, and means, substantially such as described and shown, for engaging the clutch, hubs, or disks.

8. In a railway-signal mechanism, the combination of a motor, H, provided with a disk, *f*, a second disk, *i*, bearing a hand, *h*, and connected with a spring, *l*, an arm, *k*, arranged to be moved to or from one of said disks and to produce or destroy the engagement of the disks, a spring, *n*, adapted and arranged to hold the arm *k* normally in contact with the disk, a lever located beside the railway-track in position to be moved by a passing train, and a pivoted signal or signal-bearing arm overhanging the indicator and adapted to be raised and lowered thereby, substantially as set forth.

9. The herein-described signal apparatus,

consisting of motor H, bearing-disk *f*, disk *i*, provided with hand *h* and connected with spring *l*, arm *k*, spring *n*, rod G, rock-shaft E, provided with lever D and crank-arm F, and a signal overhanging the hand *h*, all substantially as shown and described.

10. In combination with signal mechanism C, substantially such as described and shown, rock-shaft E, provided with lever D and crank-arm F, and the intermediate arm, G, connecting the crank-arm and signal mechanism, provided with arm *w* and inclosed within a post, B, said post being provided with a hole, *v*, to receive a key or instrument whereby the rod may be moved manually and the signal operated independently of the trains.

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