(No Model.)

J. P. DUNN.

SIGNALING APPARATUS FOR RAILROADS.

No. 315,394. Patented Apr. 7, 1885.

Fig. 1.

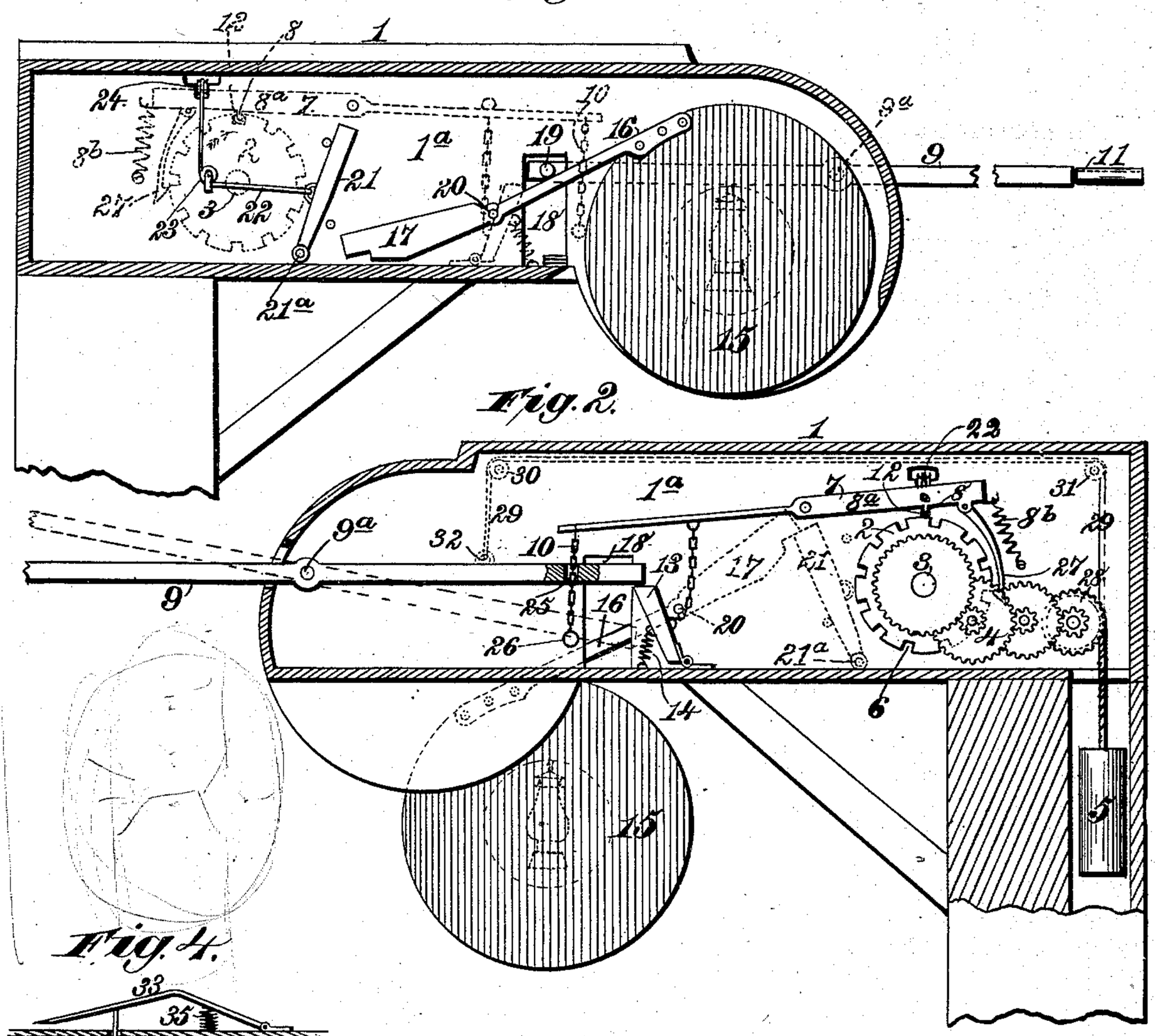


Fig. 2.

Fig. 4.

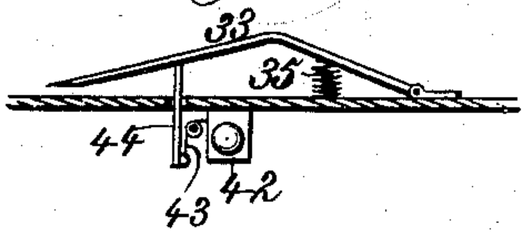


Fig. 5.

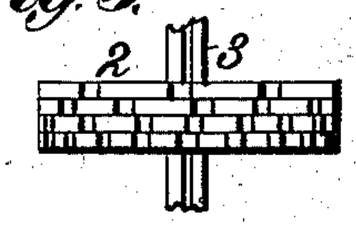
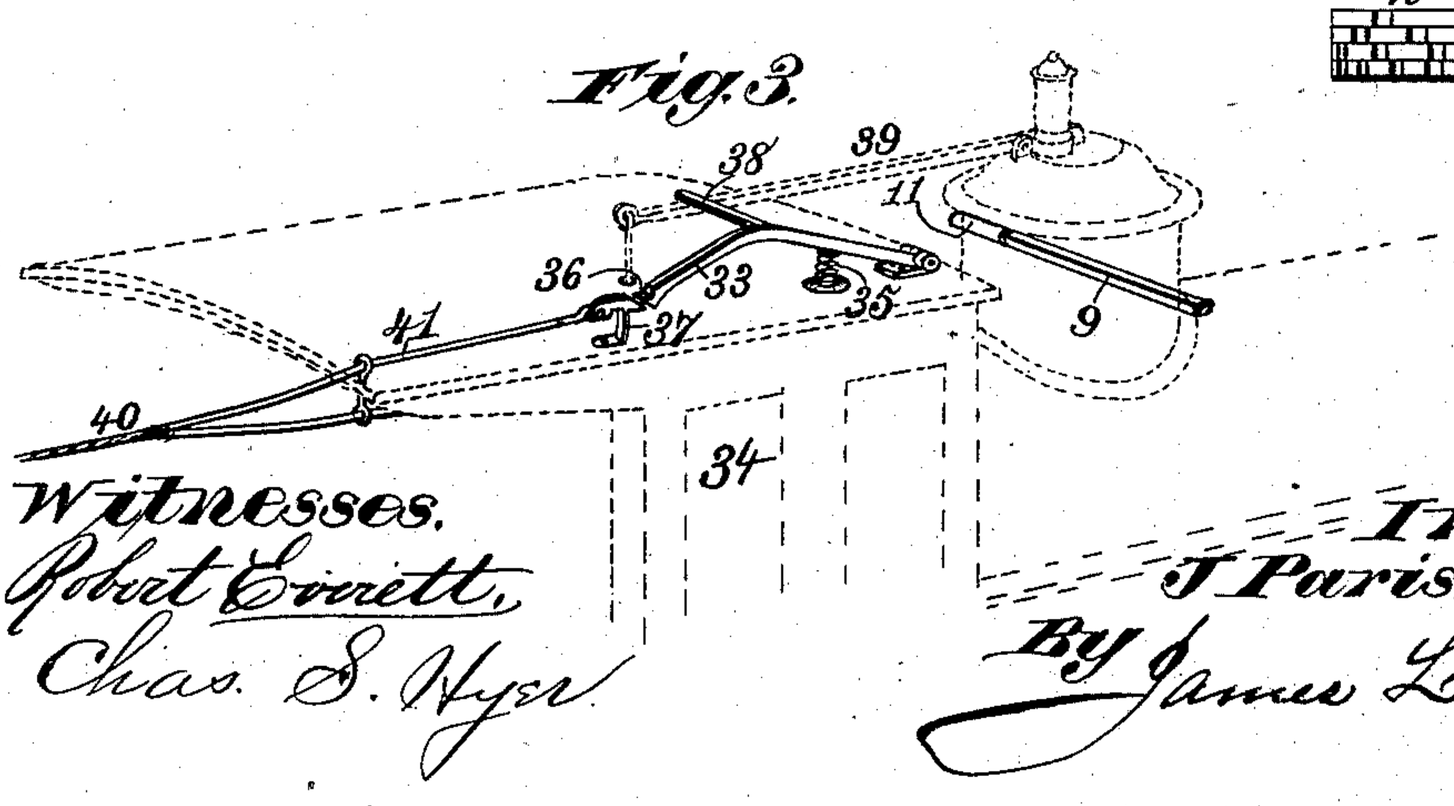


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SIGNALING APPARATUS FOR RAILROADS.

SPECIFICATION forming part of Letters Patent No. 315,394, dated April 7, 1885.

Application filed April 12, 1884. (No model.)

To all whom it may concern:

Be it known that I, J. PARIS DUNN, a citizen of the United States, residing at New York city, New York, have invented new and useful Improvements in Signaling Apparatus for Railroads, of which the following is a specification.

My invention relates to that class of railway-signals which are employed to give notice automatically of preceding trains, and to warn the engineer of the interval of time which separates his train from the one in advance.

It is the purpose of my invention to provide a simple automatic mechanism which shall be certain and efficient in operation, and by which each passing train shall be warned of its approach to the next preceding train when the interval of time between them is less than a predetermined number of minutes.

It is also the purpose of my invention to provide means whereby the said signaling apparatus shall be operated by each passing train either to drop a semaphoric signal or to sound an audible alarm upon the train, according as the interval in time between each train and the preceding one is greater or less than the predetermined time between the trains, or every two trains.

It is also the purpose of my invention to provide mechanism whereby each operation of the semaphoric signal shall lock the parts during a definite interval in such position that the passage of the next train before the expiration of the predetermined interval of time will sound an audible signal upon the train, while the successive operations of the semaphore shall restore the actuating weight or spring to its original position in readiness for the succeeding operation.

To these ends my invention consists in the several novel features of construction and combinations of parts hereinafter set forth, and fully pointed out in the claims.

Referring to the drawings, Figure 1 is a vertical longitudinal section taken through the signal-box upon one side of a central partition which divides the casing into two parts. Fig. 2 is a similar view showing the opposite side, the section plane being upon the opposite side of the partition. Fig. 3 is a perspective showing the attachments to the train or locomotive by which the signal is operated. Fig. 4 is a detail section showing a modified construction of the audible signal. Fig. 5 is a detail showing a modified construction of the disk.

In the said drawings, the reference-number 1 indicates the apparatus-casing, which may be of wood or metal and of any desired form. This casing is mounted upon a post beside the line and within a fixed distance from the track, as hereinafter described. This casing is divided into two parts or chambers by a vertical longitudinal partition, 1^a.

Within the casing I journal a disk, 2, having its periphery divided into any desired number of equal spaces, each representing a fractional part of an hour—as, for example, if the disk is to have one revolution an hour, and is divided into twelve parts, each division will represent five minutes in time, and this interval may be varied either by increasing or decreasing the number of such spaces, or by giving a more or less rapid rotation to the disk, which is moved upon its spindle 3 by a common train of clock-gearing, 4, actuated by a weight, 5, or by a spring. The periphery of the disk is provided with a series of notches, 6, equal in number to the number of spaces and having corresponding arrangement, and above the disk is pivoted a lever, 7, having a detent, 8, which engages with the notches of the disk and arrests its rotation. This lever may be provided with a weight, 8^a, or actuated by a spring, 8^b, in such manner that it is normally thrown into such engagement whenever one of the notches passes under its detent. At or near its forward end this detent-lever is connected with an actuating-lever, 9, pivoted to the casing at a point, 9^a; between its ends, the inner end of said lever being normally thrown upward by the preponderance of weight of its outer end. The connection between these two levers may be by a chain, 10, or any other suitable means, the single condition being that the connected end of the actuating-lever shall pass through a certain arc before it begins to actuate the detent-lever. The purpose of this condition will be explained hereinafter.

The outer end of the actuating-lever projects beyond the casing, as shown in Figs. 1 and 2, and lies in a position transverse to the track, its end being provided with a loose

sleeve, 11, which may rotate freely in either direction, for the purpose of allowing the lever to be actuated by a passing train without such friction as to create a violent side-thrust. It will be seen by reference to Fig. 2 that by throwing this end of the lever upward the inner end thereof will be depressed, drawing upon the chain which connects it with the detent-lever 7, and thereby raising the weighted end of the latter, whereby the detent 8 will be lifted out of the notch in the disk 2, setting the latter free. As rotation of the disk begins, the release of the actuating-lever from engagement with the device by which its outer end is raised will slacken the chain 10, whereby the weight or spring upon the end of the lever 7 will drop the detent upon the periphery of the disk, and as its extremity is provided with a friction-roll, 12, it will ride thereon as the disk revolves until it reaches the next succeeding notch therein, with which it will engage automatically, arresting the disk and restoring the parts described to their original position.

Behind the inner end of the lever 9 is placed a hinged dog, 13, which is thrown back against the action of a spring, 14, by the rise of the inner end of the lever 9, which sweeps over the inclined edge of the dog as the inner end of the lever is thrown up by the weight of its outer end. As the end of the lever passes above the end of the dog, the spring 14 draws the dog under the said end, as seen in Fig. 2, preventing the outer end of the lever from being raised. The dog 13 is connected by a chain, cord, or similar device passing over a pin or pulley rigidly mounted on the casing with the outer end of the detent-lever 7, and by the rise of said end as the detent 8 drops into the notch in the disk the dog will be drawn back from under the lever 9, allowing it to drop back to its former position. It will be seen that each time the latter is operated to release the disk it—that is to say, the lever 9—will be drawn back to its former position by the weight of its outer end, which overbalances that of the inner end, and as the latter rises above the end of the dog 13 said dog will be drawn forward by the spring 14 and engage the inner end of the lever, which will thus be locked by this dog in the position shown in full lines in Fig. 2, and will remain locked in such position as long as the disk 2 is in motion. The purpose of locking this lever in this manner is to secure the automatic operation of an audible signal on a passing train, in the manner hereinafter described.

In the outer end of the casing 1 is placed any suitable semaphoric signal, 15—such, for example, as a disk or other suitable device—having color or numbers or carrying a light, as may be desired. This signal may conveniently be carried by a pivoted arm, 16, having a counter-balance or weight, 17, by which it is normally raised into the casing. Through the wall of the casing 1 is cut a slot, 18, to admit a pin, 19, carried upon the end of the lever 9 and overlying the pivoted arm 16 between the pivotal point 20 and the signal 15. Raising the outer end of the lever 9 carries down the pin 19, throwing down the signal 15 and raising the weight 17. Behind the end of the weight 17 is a dog, 21, hinged at the point 21^a to the casing, and lying in the arc traversed by the inner or weighted end of the arm. The rise of the weighted end pushes the dog back, and as said weight passes above it the dog drops beneath and holds it up, as shown in Fig. 2 in dotted lines. To the back of this dog is attached a cord, 22, which passes over a pulley, 23, thence over a second pulley, 24, and down to the weighted or spring-actuated end of the detent-lever 7. The drop of this end of lever 7, as the detent engages with the notch in the disk, trips the dog 21 from under the weight 17, and the fall of the weight throws the signal 15 up into its casing.

The chain or cord 10, by which the detent-lever is connected with the end of the actuating-lever, is passed through a slot, 25, in the latter, and provided with a stop, 26, placed at a suitable distance below the end of the lever. The chain moving freely in this slot until the stop strikes the lower side of the lever, sufficient movement is given to the pin 19 to actuate the semaphore 15 without imparting an excess of movement to the detent-lever 7.

It will be seen from the foregoing description that the operation of the lever 9 will release the disk, exhibit the signal, and lock both the latter and the actuating-lever in the position shown in dotted and full lines, respectively, in Fig. 2, as long as the end of the detent is riding upon the periphery of the disk 2. The moment the detent drops into a notch, the lever is unlocked, the signal is raised, and all the parts restored to their original position.

In order to insure the rotation of the disk 2, so that the detent may not by accident drop back into the notch from which it has been lifted, I attach a gravity-pawl, 27, to the end of the lever 7, said pawl having a hooked end engaging with the disk, the arrangement being such that the lever 7 may rise far enough to clear the detent from the disk before the pawl effects an operative engagement with the disk. This initiates the rotation of the disk and insures the proper operation of the parts.

The clock-work or train of gearing 4, by which the disk is revolved, may be operated by a weight, 5, having its cord running from a drum, 28.

In order to render the apparatus permanently operative and avoid the necessity of constantly winding the weight, I provide automatic winding devices, by which the weight is raised and its cord rewound on the drum at each successive action of the mechanism. This mechanism consists simply of a cord, 29, attached to the end of the actuating-lever 9, and running over pulleys 30 and 31, and thence

to and around the drum in a direction reverse to that of the weight-cord. Each operation of the lever 9 will rewind the latter upon the drum, always raising the weight to the same height. By placing the eye 32, to which the cord 29 is attached, at the proper distance from the end of the lever, the drum may be rotated to the exact extent required to restore the cord run off by the preceding action of the gearing.

This signal is adapted to be operated by a passing locomotive or train, and for that purpose a bar, 33, is mounted upon the cab 34 of the locomotive, near the edge of its roof. This bar is bent, as shown in Fig. 3, and hinged at one end, and beneath it, near the point of attachment, is placed a powerful spring, 35, upon which it rests. The opposite end has a tooth, 36, lying above a spring-dog, 37, which, when the bar is sufficiently depressed, snaps over its tooth 36 and holds it down. Upon the bar, at or near its angle, is a horizontal transverse rod, 38, which extends over the lever 39, by which the steam-whistle is operated. The bell-cord 40, which enters the cab, has a branch, 41, attached to the spring-dog 37, and by drawing upon the bell-cord the dog is released from the bar, which is at once thrown up by the spring 35.

This signal is especially adapted for use upon lines where trains are run in rapid succession, or where trains run from several branch lines upon a main line. The purpose of the signal is to notify the engineer and conductor, both by a visible and an audible signal, of the fact that the preceding train has passed the signal-point within the minimum time allowed by the schedule, thereby enabling the train to be slowed or stopped, as circumstances may require. The locomotive-cab, in passing beneath the projecting end of the lever 9, brings the bar 33 into engagement with the end of the said lever, and if the latter is not locked by the pawl 13 the tension of the spring 35 is sufficient to throw up the outer end of the lever 9 and drop the signal 15, both the lever and the signal being locked by the dogs 13 and 21 in the manner already described. If, now, a second train reaches this point upon the line during the interval of time represented by a single division upon the periphery of the disk 2, not only will the presence of the signal 15 give warning that the preceding train has passed within that period, but the lever 9 being locked, it will not rise as the angular bar 33 rides under its end, but it will throw the bar down into engagement with the spring-dog 37. This depresses the lever 39 and opens the whistle, which sounds till the dog 37 is tripped by a pull upon the cord. On the other hand, if the signal 15 is raised, the lever 9 will not be locked, and the engineer will know that the preceding train has passed a time equal to or exceeding the interval represented by the division of the disk. The second train therefore merely lifts the lever, releases the disk, drops the signal, and leaves it ready to signal the next succeeding train.

Instead of operating the whistle, I may use a gong, 42, operated by a spring-escapement of the ordinary kind, and operate it by attaching to its drum a cord, 43, which runs over a pulley, 44, and is connected to the end of a vertical arm carried by the bar 33. The depression of the latter will wind the spring-drum and set the gong to sounding.

As it is often necessary to change the intervals of time between regular trains upon the same road, and as it is not altogether convenient to remove the time-disks, I have devised a compound disk. (Shown in Fig. 5.) This consists merely of two, three, or more disks, each having a different time-division indicated upon its periphery. These several disks are united and mounted upon the same spindle. By adjusting them upon said spindle any one may be brought under the detent and the time of action of the signal changed to correspond.

Having thus described my invention, what I claim is—

1. The combination, with a disk having its periphery divided to represent equal increments of time, of mechanism for giving rotation to said disk, a detent-lever engaging with and arresting the rotation of said disk, an actuating-lever operated by a passing train, and a semaphoric signal which is displayed by the operation of the actuating-lever, substantially as described.

2. The combination, with a disk having its surface divided to represent equal intervals of time, of mechanism for rotating said disk, a detent engaging with the disk and arresting said rotation, a pivoted lever carrying said detent, and a gravity-pawl hinged upon the end of said lever and drawing upon the periphery of the disk as the detent rises from it to initiate the rotation of the latter, substantially as described.

3. The combination, with a disk having its periphery divided by notches into equal portions, of a pivoted lever having a detent which engages with said notches, an actuating-lever projecting beyond the casing and connected to the detent-lever, and a dog locking the actuating-lever upon the disengagement of the detent, and tripped from beneath it by the rise of the detent-lever upon the engagement of its detent with the notches of the disk, substantially as described.

4. The combination, with a rotating time-disk, of a detent-lever, an actuating-lever connected therewith, a signal carried upon a pivoted weighted arm, a pin mounted upon the actuating-lever and overlying the signal-arm, and a dog locking the weighted end of the latter as the signal is dropped and tripped from beneath it by the detent-lever upon its engagement with the disk, substantially as described.

5. The combination, with a notched time-disk having a fixed rotation, of a detent-lever

by which it is released and arrested, a pivoted actuating-lever connected with and operating the detent-lever, and a cord leading from the actuating-lever to the drum of the clock-gearing, by which rotation is given the disk, whereby the drum is wound after each fractional rotation, substantially as described.

6. The combination, with a notched time-disk, of a releasing-lever having a detent engaging with the notches in said disk, a pivoted actuating-lever connected with the releasing-lever, a semaphoric signal thrown down by the actuating-lever, and a gravity-pawl hinged behind the inner end of the arm carrying the signal, and locking the latter in view during a partial rotation of the disk and releasing it as said rotation is arrested, substantially as described.

7. The combination, with a disk having its periphery equally divided by notches, of a detent resting upon it and engaging at intervals with said notches, a pivoted lever carrying said detent, a pivoted actuating-lever connected with the detent-lever, a dog automatically locking the same during the movement of the disk, and a spring-actuated hinged bar mounted upon the locomotive and engaging with a spring-dog when the bar is depressed, substantially as described.

8. The combination, with the notched time-disk, of a weighted lever carrying a detent engaging with the notches in said disk, an actuating-lever connected with and operating the detent-lever, and a cord connected to the inner end of the actuating-lever and passing over the pulleys to the drum carrying the weight-cord, by which movement is given to the gearing which rotates the time-disk, said cord being wound upon the drum in a direction opposite to that of the weight-cord, whereby the latter is rewound by the movement of the actuating-lever, substantially as described.

9. The combination, with a weighted and pivoted actuating-lever, of a pin mounted upon or near its end, a semaphoric signal carried by a weighted arm, and a dog pivoted behind the rear end of the arm carrying the signal, by which said signal is locked in view, substantially as described.

10. The combination, with the notched time-disk, of a pivoted releasing and arresting lever having a detent engaging with the notches in said disk, an actuating-lever connected with it, a signal carried by a pivoted arm and thrown down into sight by the action of the actuating-lever, a pawl hinged behind the end of the signal-supporting arm, and a cord leading from said pawl to the inner end of the detent-lever, by which the pawl is tripped as the detent engages with a notch upon the disk, substantially as described.

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

J. PARIS DUNN.

Witnesses:

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