3 Sheets--Sheet 1.

J. F. KETTELL.

Station-Indicators.

No. 152,385. Patented June 23, 1874.

Fig. 1

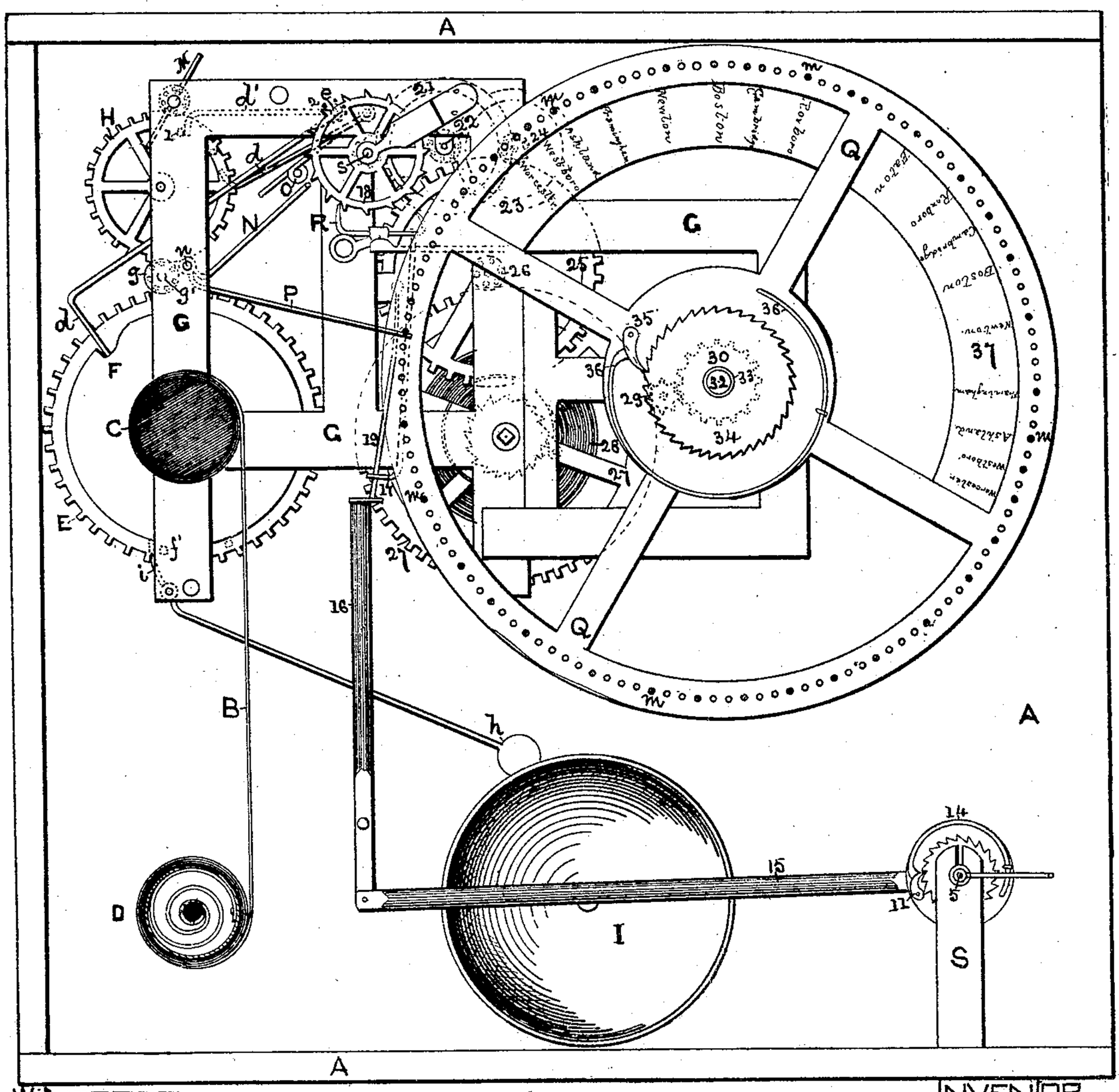

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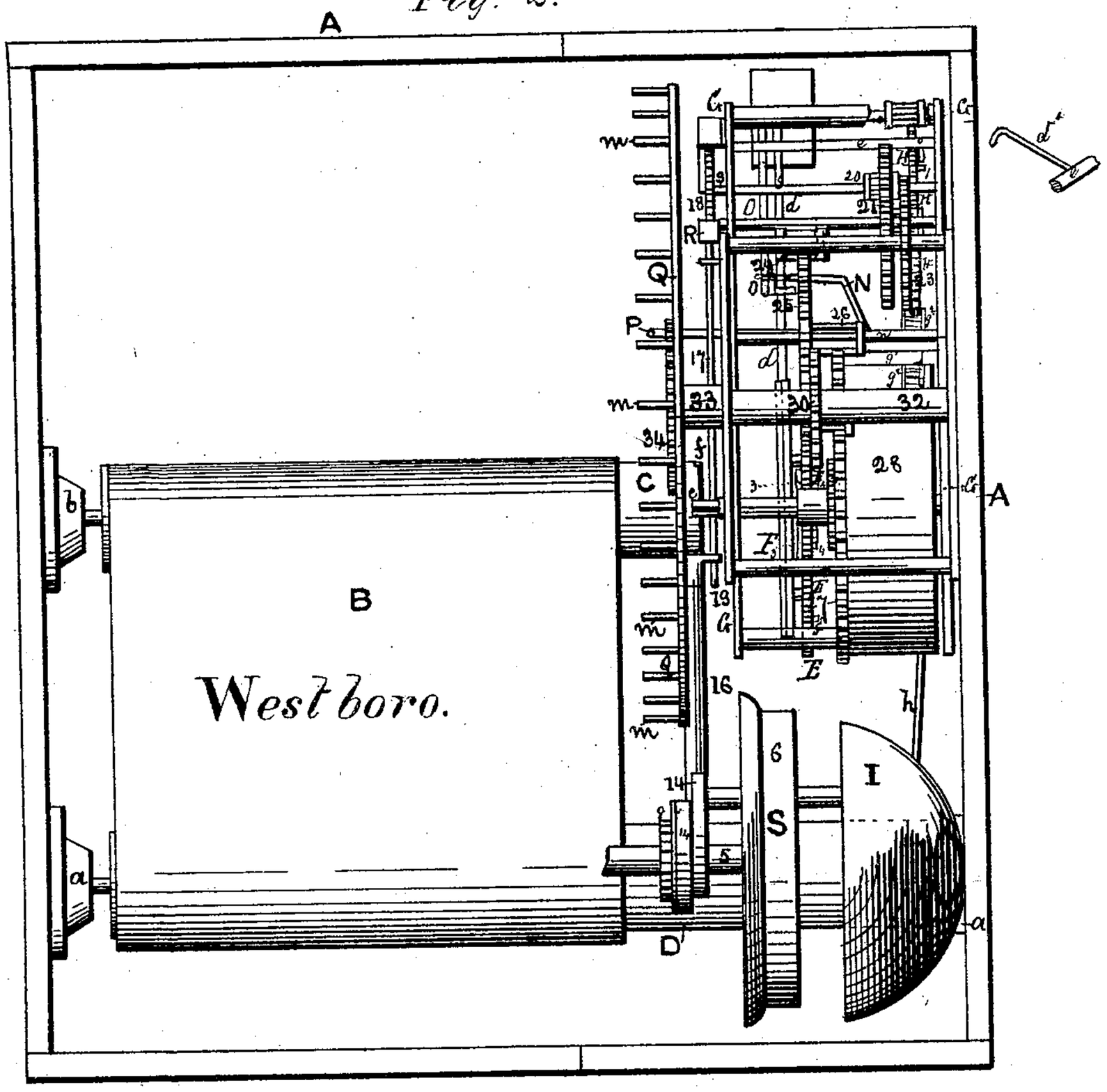
Fig. 2.



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3 Sheets--Sheet 3.

J. F. KETTELL.

Station-Indicators.

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Fig. 3.

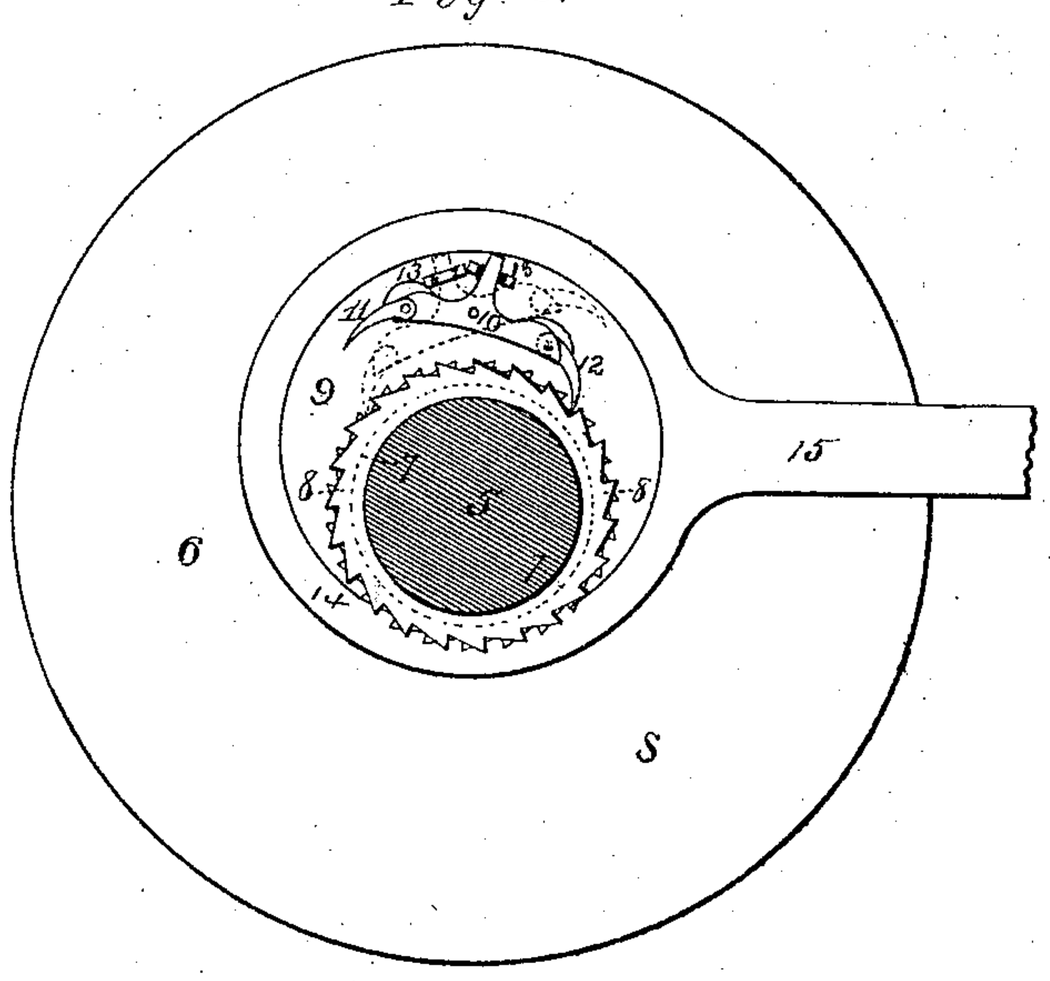
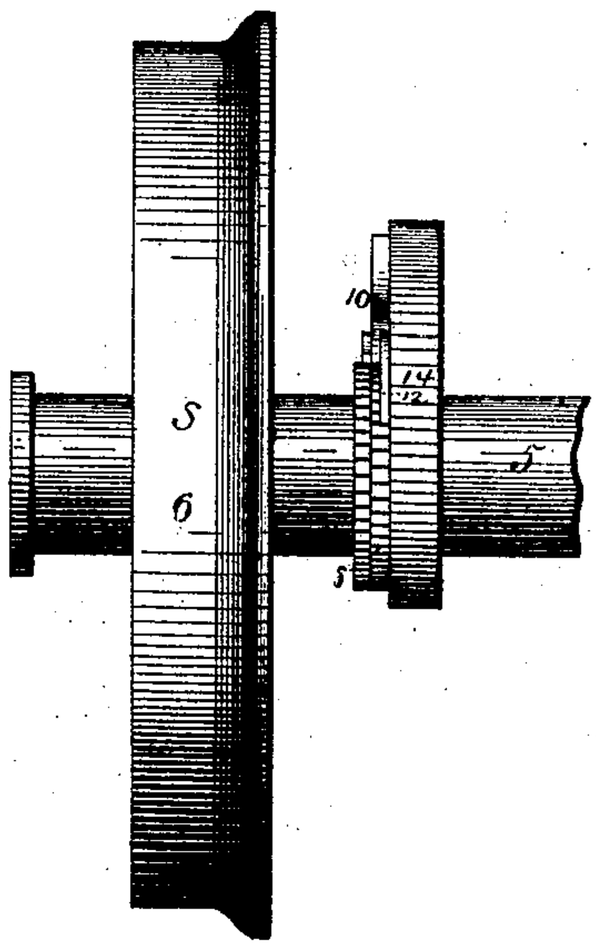


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES F. KETTELL, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN STATION-INDICATORS.

Specification forming part of Letters Patent No. **152,385**, dated June 23, 1874; application filed July 26, 1873.

To all whom it may concern:

Be it known that I, JAMES F. KETTELL, of Worcester, in the county of Worcester and State of Massachusetts, have invented a certain Improved Railway-Station Indicator, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved apparatus, and Fig. 2 a front view of the same. Fig. 3 represents a detached and enlarged view of a car-wheel and axle, showing a modification of the mechanism through which the apparatus is automatically operated in running the cars in either direction; and Fig. 4, an end view of the same.

My invention relates to a new and improved station-indicator for use in railroad-cars and other public conveyances, such as river steamboats, &c. The invention consists in the use of a curtain or web of cloth or other suitable material having a duplicate list of the way-stations marked or printed thereon in reverse order and in proper succession, said web being mounted on two rollers, one of which shall be self-winding, while the other is so combined with a clutch device that the web shall remain stationary until the clutch is released, either by hand through suitable devices, or automatically by the travel of the car, when the other or self-winding roller shall then wind up that portion of the web on which the last station was marked, and bring into view that portion on which the name of the approaching station is painted or printed, suitable devices being attached by means of which the winding of the web is summarily arrested when the name has been fairly brought into view. It also consists in combining said web with one of the axles of a car through the medium of certain devices hereinafter to be described, whereby the indicator may be operated automatically, so as to exhibit the name of the station being approached after the train has fairly left or passed the last one. It also consists in combining with said web as operated an alarm device, by means of which, when the change is being made, the attention of the passengers is called to the name of the station being approached, as indicated on the apparatus.

To enable others skilled in the art to make, construct, and use my invention, I will now describe it in detail.

The apparatus is represented as being arranged in a box, A, to be secured at the top of one of the corners of the car. The web B, on which the names of the stations are printed, as shown in Fig. 2, is mounted on two rolls, C and D, the self-winding roller, D, being mounted in suitable bearings *a a* in the sides of the box, while the other, C, is arranged immediately above or below it, and mounted at one end in a bearing, *b*, secured to the side of the box, and at the other end upon a bearing formed by the shaft or axis *c*, which carries a snail-cam or notched disk, F, said shaft *c* having its bearings arranged in the frame G, that carries the automatic devices hereafter to be described, which release the notched disk F from the detent *d*, that arrests the revolution of the roller C, and thereby prevents the further winding up of the web by the self-winding roller D. For these purposes the end of the shaft *c*, which forms the bearing of the roller C, is squared so as to engage with a correspondingly-formed opening made in a metallic cap or strap, *f*, secured on that end of the roller C. The detent *d* may be made similar to that of the detent used in connection with the wheel in a common clock for regulating the striking of the hours, being attached or secured to a rock-shaft, *e*, which has its bearings in the frame G, and may simply be so arranged as to act by its own gravity; or it may be provided with a small spring, so as to keep its point constantly pressed upon the periphery of the notched disk F.

Thus constructed and arranged, the apparatus, so far as described, may be operated by hand by attaching a cam or lever, N, in such manner as to raise the detent *d* out of the notch of the disk F for a length of time sufficient to allow the self-winding roller to drag on the web until the revolution of the roller C, acting on the square end of the shaft of the notched disk F, shall have caused the notch to pass from under the point of the detent *d*, after which the roller D will continue to wind the web until the notch in the disk will have been brought under the point of the detent *d* again, which, then descending, will arrest its

further revolution, and with it that of the roller C, the latter having just performed one full revolution, and, by that act, exposing to view the name of the station being approached, there being allowed to the web B for each name a length sufficient for one revolution of the roller C; or the lever N of each box in the different cars may all be connected together by a suitable crank-lever, P, and connecting-cords, under the charge of the engineer or conductor of the train, and all operated simultaneously on leaving the last station, in which event stout springs would be suitably attached to the crank-lever P to drag it down, so as to release the detent *d* before the notched disk F has completed one revolution. When intended to be operated by hand in this way, the notched disk F may be mounted directly on the shaft or axis of the roller C, in which event it would be mounted in a bearing formed on the side of the box, like the bearings *a a* of the self-winding roller D. A small stud-pin, *f'*, may then be secured to the side of the disk F, near its periphery, at or near the notch, and of a length sufficient to come in contact with a short lever, *i*, mounted on a rock-shaft which has its bearings in a frame or bracket secured to the side of the box. This rock-shaft carries a bell-hammer, *h*, by means of which the disk, for every revolution it makes, is made, through its stud-pin, to raise the hammer *h* and sound an alarm on the bell I, and which, for this purpose, is suitably arranged and secured to the frame of the apparatus. In order to insure the stoppage of the roller C at the end of each revolution, especially when intended to be operated automatically, I prefer to mount the disk F on a shaft, *c*, either directly or by suitably securing it to a gear-wheel, E, loosely mounted on the shaft *c*, in which event the gear-wheel may carry the stud-pin *f'*, that operates the lever *i* of the hammer rock-shaft. The gear E meshes with a pinion, *g*, the shaft g^1 of which has its bearings in the frame G, and carries, on its other end, another pinion, g^2, which drives another gear, H. The latter carries two small stud-pins, 1, arranged diametrically opposite each other, which are brought alternately in contact with the bent end of an arm, *d'*, secured to the same rock-shaft which carries the detent *d*. In this case, the relation of the gears E and H, and their respective pinions *g* and g^1, is such that for each revolution of the gear E the gear H will make two and a half revolutions, and hence the necessity of two stud-pins, 1. Where, however, the gear-wheel H, through the intermediate pinions, is made to perform two, three, or more whole revolutions, but one stud-pin would be required; but, as before said, if deemed advisable, this entire series of gears and pinions may be dispensed with, simply retaining the detent *d*, notched disk F, and shaft *c*. The gear-wheel E, to which the snail-cam or notched disk F is secured, is loosely mounted, as before stated, on the axis *c*, between a small disk, 3, and ratchet-wheel 4, both of which are firmly secured to the axis *c*. To the side of the gear E, on the side next the ratchet-wheel 4, is pivoted a pawl, which engages with the teeth of the latter, a curved spring suitably attached to the same side of the gear being arranged to press on the back of the pawl to keep it in place.

This arrangement enables the roller C to be wound without moving either the gear E or disk F, but prevents it from being unwound without moving either, or the pinions g g^2 and gear H, all of which will revolve until the detent *d* descends into the notch of disk F, which act will have turned its rock-shaft and carried with it the arm *d'*, thereby bringing its bent or detent end directly in the path of the studs 1 on the side of the gear H, arresting it and, through it and the train of gears, the further revolution of the axis *c* of the curtain-roll C. The studs 1 on gear H are so arranged as to arrest its motion before the detent *d* (although in the notch of the disk F) reaches its rear side, so that should the arm *d'* happen to pass the studs 1 in gear H detent *d* will arrest disk F.

By reference to the drawing it will be seen that a buzz-wheel, M, is arranged to operate in connection with the train of gears just referred to, in order to moderate their speed; but it may be dispensed with, if desired.

With reference to the self-winding roller D, it may be made in any suitable and known way; but as its construction forms no part of this invention, a detailed description is not deemed necessary.

In the drawings, the disk F is represented as being automatically released from the detent *d* by means of a lever, N, secured to a rock-shaft, *n*, which has its bearings in the frame G of the apparatus. The end of the lever N is bent or turned to form a bearing to act against another pivoted lever, O, which has its bearings in the frame G, also. The lever O, when acted on by lever N, presses against the under side of detent *d* and raises it out of the notch in disk F, thereby releasing the latter. To the rock-shaft *n* is secured another lever, P, which is so arranged as to be acted on by stud-pins *m* on a large disk or wheel, Q, which is driven by clock-work, the verge or escapement R of which is operated by the rotation of one of the car-wheel axles, and in a way which I will now describe.

In Fig. 1 no car-wheel is shown, a standard, S, being substituted therefor, in order to illustrate the invention in a compact form; an enlarged detached view, however, is shown in Fig. 4, which illustrates the connection. On the axle 5 of the car-wheel 6, and on the inside of the latter, are mounted and secured a collar, 7, and double ratchet-wheel 8—that is to say, a wheel having a double row of ratchet-teeth, running in reverse directions; or, instead of the latter, two ratchet-wheels may be used, with their teeth arranged to run in opposite directions. Over the collar 7 is eccentrically and loosely mounted a disk, 9, so

as to form a cam. To the side of this cam is pivoted a cam-lever, 10, carrying two pawls, 11 and 12, which are, respectively, pivoted at its lower or widened end to its opposite sides, each pawl being provided with a spring on its upper side, to keep it in place when engaged with the teeth of their respective ratchets, one end of these springs being firmly secured to the lever 10. These pawls are so arranged as that the one shall engage with the one set of ratchet-teeth, and the other with the other, and each provided with a stop on said lever, to prevent them from dropping down too low when not engaged with the ratchet. Thus constructed, by turning the lever 10 in one direction it will cause one of the pawls to engage with a tooth of its ratchet, and disengage at the same time the other pawl from the other ratchet, and vice versa.

When once adjusted the cam-lever 10 may be held in place by any suitable device—as, for instance, by a spring-clutch, 13, similar to that shown in Fig. 3.

By this arrangement, the lever being mounted on the cam 9, should the axle be turning in the direction in which the engaged pawl bites the teeth of the ratchet, it will carry the cam 9 with it; but if moving in the opposite direction, it will allow the pawl to slip back over the teeth, leaving the cam stationary. On the cam 9 is mounted a cam-yoke, 14, forming one end of a pitman-rod, 15, the other end of which is hinged to the end of a pivoted lever, 16, the upper end of which is provided with a loop, which loosely embraces a pendulum-rod, 19. The lower end of the lever 17 of the verge or escapement R also embraces the pendulum-rod, as in the common clock, so that for each revolution of the axle of the car-wheel the escapement-wheel 18 is made to revolve for a distance equal to the space of a tooth, these devices acting in this respect in the same manner as the beat of a pendulum would. The shaft *s* of the escapement-wheel 18 carries a pinion, 20, which in turn meshes with a gear, 21, the shaft of which carries another pinion, 22, meshing with gear-wheel 23, the shaft of which carries another pinion, 24, which again meshes with gear-wheel 25, the shaft of which also carries a pinion, which works in a large gear-wheel, 27, whose shaft forms, as in an ordinary clock, the barrel, on which is wound the spring 28, that gives motion to this train of gears. The gear-wheel 27, unlike the other gears, is mounted loosely on its shaft between a disk and ratchet-wheel, and carries a pawl and spring, precisely like the gear-wheel E, and for a similar purpose, to wit, to allow the winding up of the spring 28 without itself being turned therewith. The outer end of the shaft of gear-wheel 27 is squared to fit the key that winds up the spring 28. The gear-wheel 27 imparts motion to a small pinion, 29, on the opposite side of which meshes the teeth of another gear-wheel, 30, made fast to the shaft or spindle 32, which carries the large disk or wheel Q, which, through the pins *m*, secured on its face, and lever P, actuates the lever N, which raises the detent *d* out of the notch of the disk F, in order to release the roller C, as before described. The disk or wheel Q is mounted loosely on a hollow spindle, 33, which in turn is mounted and secured to the shaft 32. For this purpose the spindle 33 is turned down at its outer end, so as to form a shoulder against which the rear side of the wheel Q, when slipped over it, may abut. Thus arranged, a ratchet-wheel, 34, is then made fast to the hollow spindle on the outside of the wheel Q. A small hole is then drilled through the outer end of the spindle and through the shaft 32, into which a pin is passed, to secure the spindle to the shaft. To the face of the pin-wheel Q is pivoted a pawl, 35, to engage with the teeth of the ratchet-wheel 34. To keep the pawl in position a curved spring is also suitably arranged and secured to the face of the wheel Q. Thus mounted, the wheel Q may be moved freely in one direction on the spindle 33 without operating the gears, but can only turn with the latter in the opposite direction. On the face of the wheel Q, near its periphery, are pierced a number of small holes at regular intervals apart, for the reception of the cam-pins *m*, for a purpose now to be described. Let us suppose that a station-indicator is desired for use in the cars running back and forth between Worcester and Boston, and let us suppose, by way of example, that the distance between these two places is forty-four miles; then, as the wheel Q only moves in one direction, it must be so made as to be able to actuate the lever P at the proper time for all way-stations between the two places, both going and returning, in one revolution at least; or it may be made to perform this in any equal fractional part—as, for instance, it may be so laid off as that a half or one-third or one-fourth part will suffice to operate the apparatus for each round trip; but for all practical purposes it may be well to make each revolution of the wheel Q answer for one round trip. The distance going being forty-four miles and the return distance the same, the periphery of the disk or the circle in which the pin-holes are made will be divided into eighty-eight equal parts, the center of each of which will form the center of a hole, each representing a mile; or it may be divided into any multiple of eighty-eight—as, for instance, one hundred and seventy-six, when they would represent half-miles, or two hundred and sixty-four for thirds and three hundred and fifty-two for quarter-miles, &c. Thus arranged, starting with Worcester, a pin is inserted into either hole and made the initial or starting point. Let us suppose the next station to be Westborough, and that Westborough is distant from Worcester twelve miles, and that the holes are arranged to represent a mile apart; then a pin is inserted in the thirteenth hole from the last, counting the holes in the opposite direction to that in which the wheel Q moves; then suppose Framingham to be the

next station, and that it is distant from Worcester twenty-three miles, then counting in the same direction, a pin is inserted in the twenty-fourth hole; then suppose Newton to be the next station, thirty-six miles from Worcester, a pin is inserted for it in the thirty-seventh hole; and that Boston is next, forty-four miles distant, a pin is inserted for it in the forty-fifth hole. Now, for the return, Newton being the first station home and distant eight miles, a pin is inserted for it in the ninth hole from the last or Boston station; then Framingham twenty-one miles, a pin is inserted in the twenty-second hole from the Boston station-pin; after which comes Westborough, which is thirty-two miles, a pin is inserted in the thirty-third hole; then comes Worcester, distant forty-four miles from Boston, and terminating at and with the initial point. As each pin is inserted, a label having the name of the place marked thereon that the pin represents may be secured opposite to the latter, for which purpose any suitable and known device may be used by securing it to the arms of the wheel Q—as, for instance, a pasteboard annular disk like that half-disk 37 shown in Fig. 1.

Having selected the road from Worcester to Boston as an example, and having assumed the distance between the two to be forty-four miles and the round-trip eighty-eight miles, we make the gear-wheel 30, which imparts motion to the pin-wheel Q, with a tooth for each mile—that is to say, we provide it with eighty-eight teeth—and then adapt the relative number of teeth on the different pinions and gears to each other in such manner that for every quarter, third, half, or whole mile, as may be desired, which the car-wheel has traveled, they will allow the main driving gear-wheel 27—the gear-wheel on whose shaft the main spring of the apparatus is wound—to move a distance equal to one tooth, and in moving that tooth through the pinion 29 to move the gear-wheel 30 one tooth also, and hence moving the wheel Q a distance equal to or representative of a mile, and so on for each and every mile run. Now, as the lever P, that releases the detent *d* from the notched disk F, is so arranged, with relation to the pins *m* on the wheel Q, that when they shall have reached a certain position they will have raised it sufficiently for that purpose, it will be seen that on reaching that position, and which is so arranged as to be shortly after they have passed the last station, the roll C will be released, allowing the self-winding roller D to wind up so much of the curtain as had the name of the last station passed marked thereon, and to bring in view the name of the station toward which the cars are now approaching. Beyond this the pin and lever are so arranged as that the former will only raise the latter to the proper height at the moment it passes from underneath the lever P, when, by the action of the spring 2, which depresses detent *d*, as well as by its own gravity, the lever P descends and allows the detent *d* to drop down upon the edge of the notched disk F, ready to arrest it on completing its one revolution, and thereby arresting the further winding of the curtain by the self-winding roll.

The mode of providing suitable mechanism for this purpose is as follows: Let us suppose that for each revolution of the car-wheel (the diameter being thirty-two inches) the car moves forward say 100.5 inches, it would require in round numbers six hundred and thirty revolutions of the wheel to run a mile, and consequently there would be during that time as many revolutions of the escapement-wheel 18 as its number of teeth is contained in six hundred and thirty, for one tooth is allowed to pass for each revolution of the wheel, as before stated. Here there exists for each mile a relation between the teeth of the escapement-wheel and the teeth of the large main gear-wheel 27, so that for one tooth of the latter that is moved in running a mile, six hundred and thirty of the former are moved; hence the intermediate gears must be so constructed with relation to each other as to reduce the number of the one down to that of the other, the process of doing which, being well understood among mechanics, is here unnecessary to be described.

Referring now to the action of the cam 9, cam-yoke 14, and the pitman-rod 15, that operates the escapement, double ratchet-wheel 8, lever 10, and pawls 11 and 12, it will be seen that the latter are so arranged as to operate the pitman-rod only when the cars are running to the next station, but not when running backward; and that by this arrangement of double pawls and double ratchet-wheels, by moving said lever 10 in the proper direction, it will, through these pawls, enable the axle to operate the apparatus, no matter in which direction the cars are running.

In this connection, however, it is proper to state that this twofold arrangement of pawls and ratchet-wheels is only intended to be used where the cars are not turned round to make the return trip; otherwise but a single ratchet-wheel and pawl would be necessary, as shown in Fig. 1, and the lever entirely dispensed with, in which case the pawl and its spring would be arranged on and secured directly to the side of the cam 9 next the ratchet-wheel 8.

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

1. The combination of the self-winding curtain B with the arrest devices F *d*, trip-levers P O N, wheel Q, and stud-pins *m*, the whole operating in the manner and for the purposes set forth.

2. The combination, with the arrest devices F *d*, of a self-winding curtain and releasing-levers P O N, gear-wheels E and H, pinions *g*

and g^2, stud-pin 1, and detent d', all operating in the manner and for the purpose set forth.

3. The combination of the self-winding curtain B, arrest devices F d, trip-levers P O N, wheel Q, and its stud-pins m, with the pitman-rod 15, cam-yoke 14, cam 9, pawl 11 or 12, ratchet-wheel 8, car-axle 5, pivoted lever 16, verge-lever 17, and verge R of a system of clock-work, substantially as described, and for the purpose set forth.

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