2 Sheets—Sheet 1.

J. F. KETTELL.

ELECTRICAL STATION-INDICATOR.

No. 171,387. Patented Dec. 21, 1875.

Fig. 1.

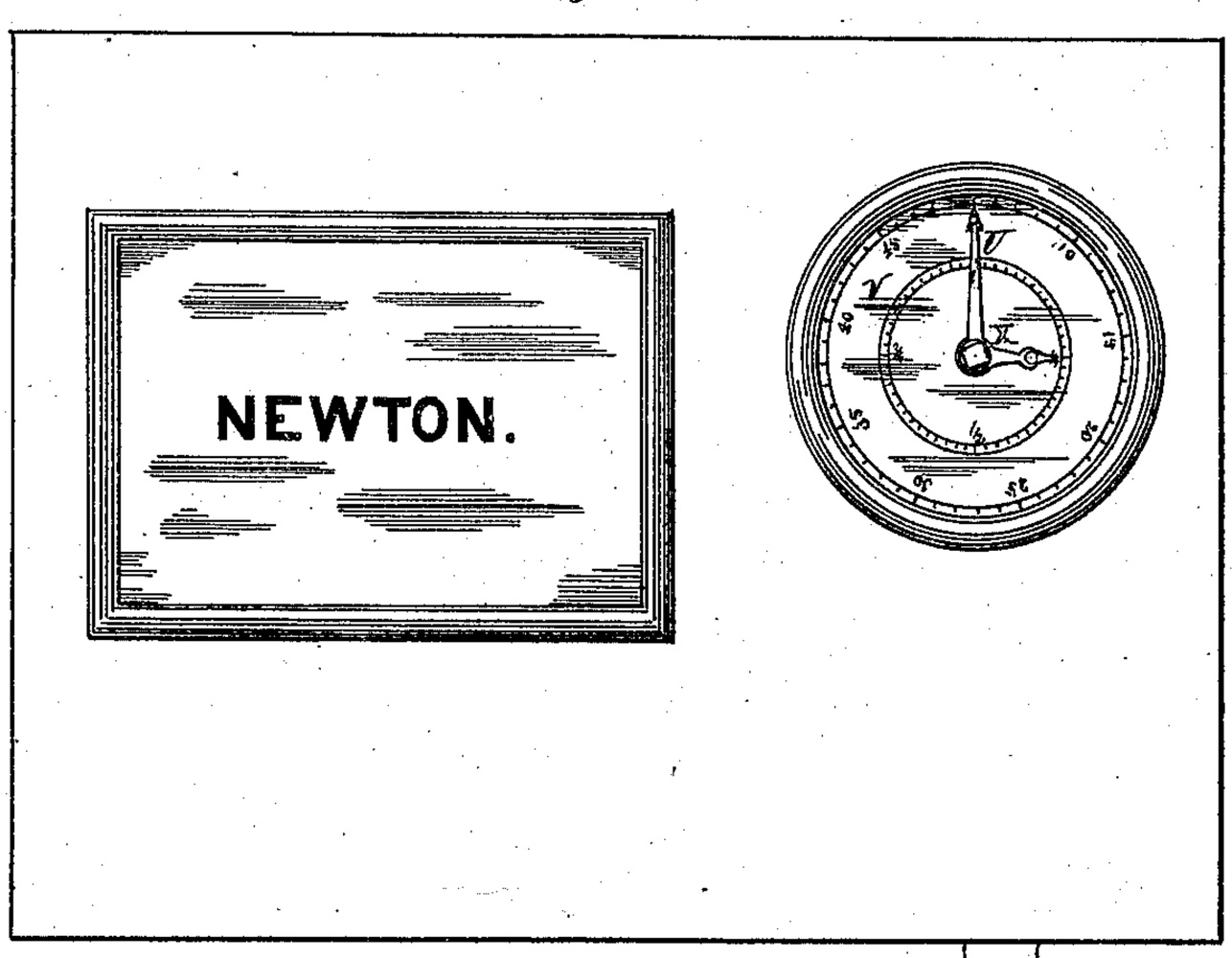


Fig. 2.ª

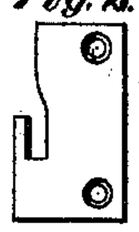
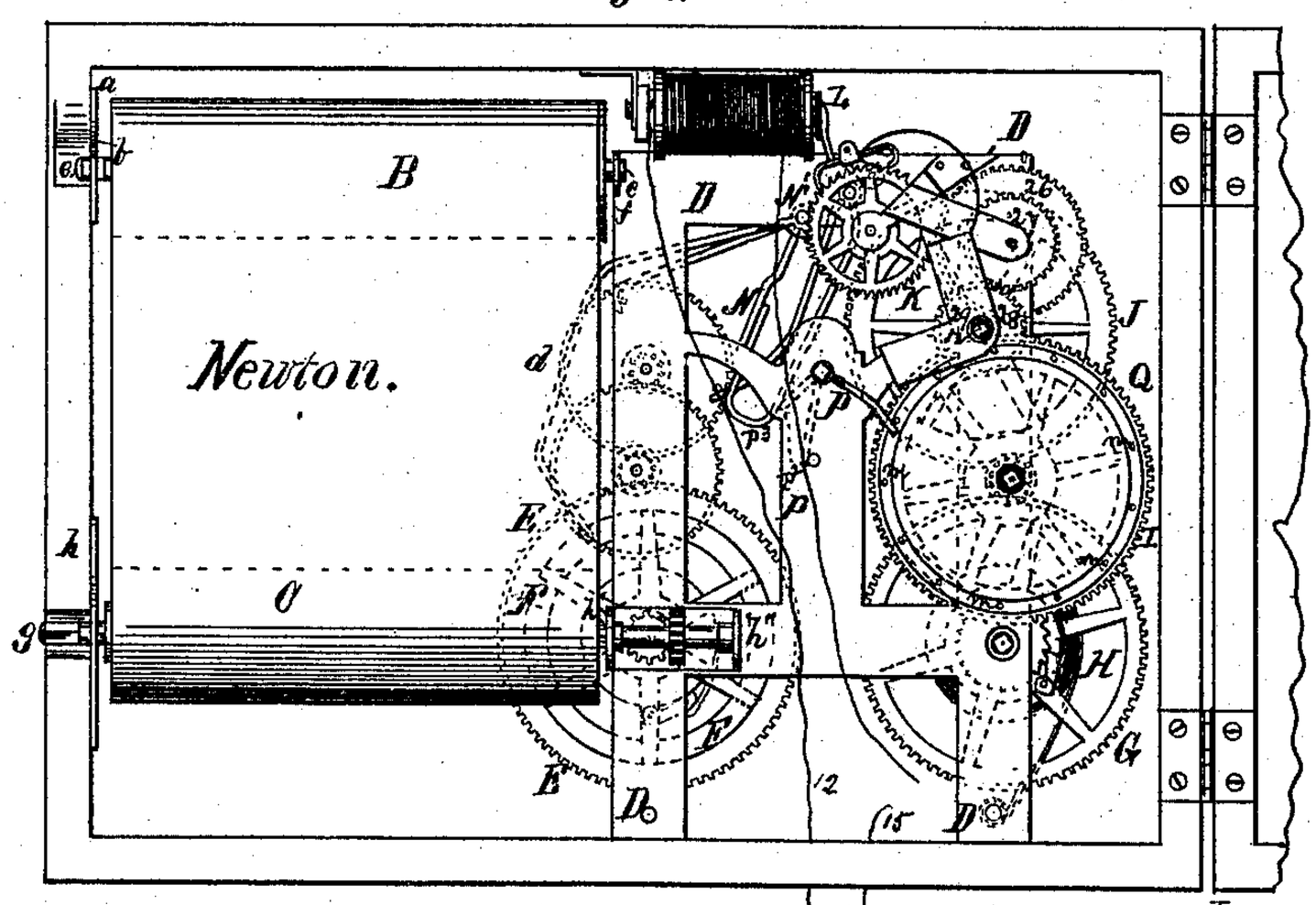


Fig. 2.



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2 Sheets—Sheet 2.

J. F. KETTELL.

ELECTRICAL STATION-INDICATOR.

No. 171,387. Patented Dec. 21, 1875.

Fig. 3.

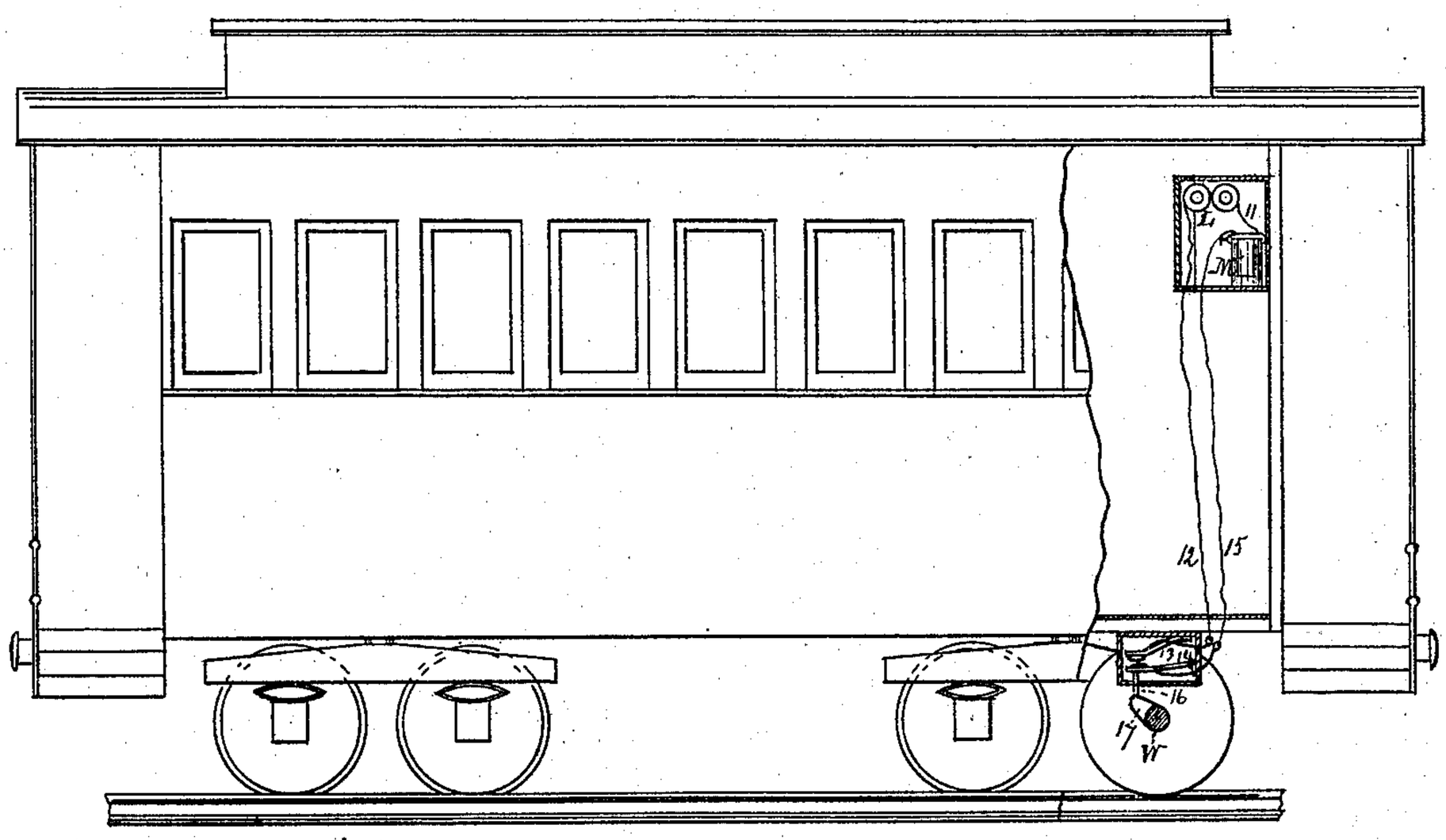


Fig. 7.

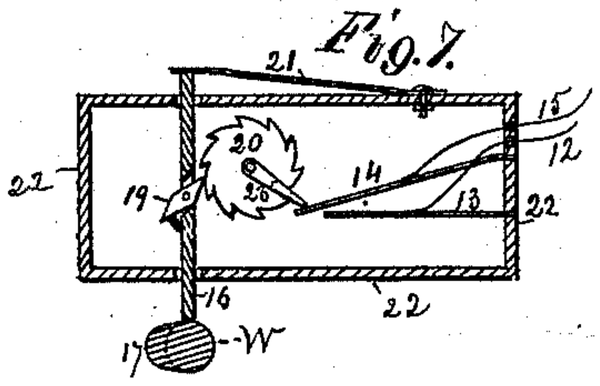


Fig. 4.

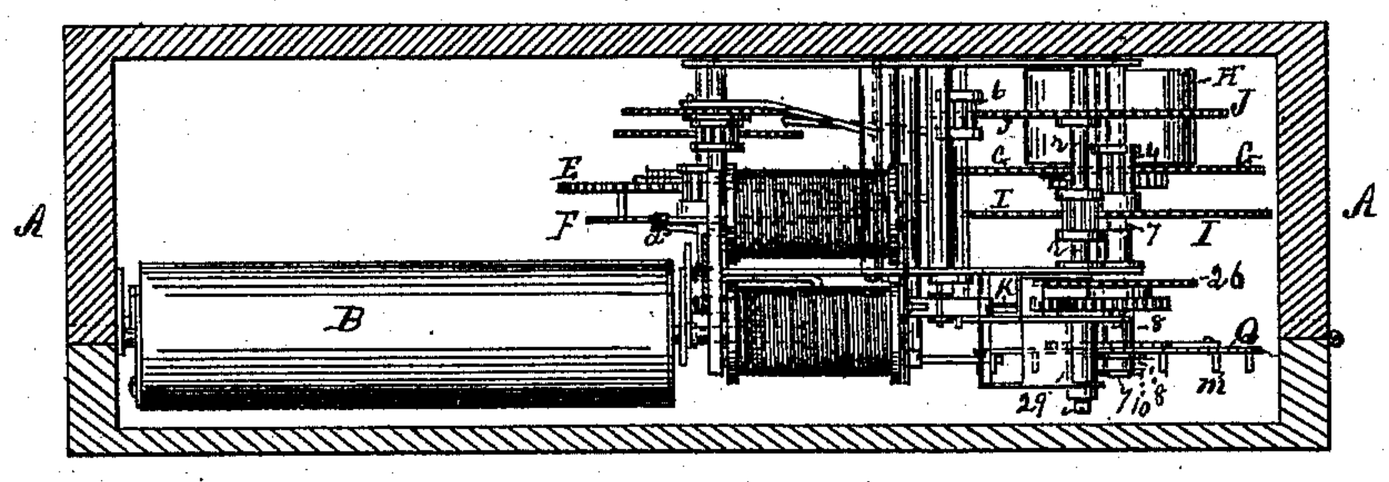


Fig. 5.

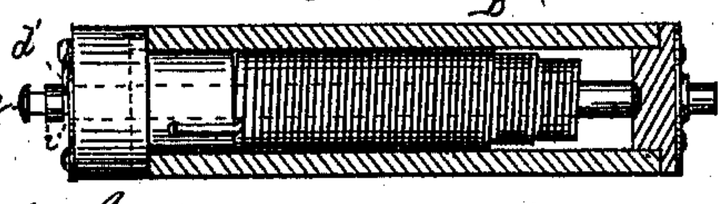
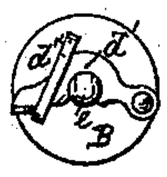


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES F. KETTELL, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN ELECTRICAL STATION-INDICATORS.

Specification forming part of Letters Patent No. **171,387**, dated December 21, 1875; application filed July 13, 1875.

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 certain new and useful Improvements in Station-Indicators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 represents a front view of my improved apparatus ready to be applied to a car. Fig. 2 represents a front elevation, with the door open and partially broken off, the dial-plate and index-fingers being also removed, in order to give a clearer view of the mechanism. Fig. 3 represents a side elevation of a car to which my improved apparatus has been applied, a portion of the side of the car being broken out in order to show the arrangement of the apparatus and the mode of applying it. Fig. 4 represents a top view of the apparatus, the top of the box for this purpose being removed, and the balance of the box shown in section. Fig. 5 represents a partial sectional view of the self-winding roller, and Fig. 6 an end view of the same. Fig. 7 represents a side elevation of a modified form of the apparatus for closing and breaking the circuit, the box which contains it for this purpose being shown in section.

My invention relates to a new and improved station-indicator for use on railroad-cars and other public conveyances, such as steamboats, &c.

The invention consists in combining, with a self-winding curtain or web of cloth, or other suitable material, having a duplicate list of the stations marked or printed thereon in reverse order and in proper succession, and with suitable mechanism for the automatic release and arrest of the self-winding curtain, an electro-magnet and battery, suitably arranged and connected respectively with the release mechanism and with the axle or shaft of the car or steamboat, whereby for each or any given number of revolutions of said axle or shaft the first or escapement wheel of the train of gears will be allowed to advance one tooth, until, by a succession of advances, the given number of teeth representative of the distance between two stations shall have passed, when, through suitable devices actuated by said train of gears, the detent which arrests the further turning of the self-winding curtain will have been raised, thereby releasing the latter and allowing it to wind up a sufficient portion of the curtain to expose the name of the next station, at which point it will be arrested by the descent of the detent into the notch of the arrest-wheel, and so on for each succeeding station. It also consists in combining with the release mechanism thus operated a dial-plate having two graduated scales and two index-fingers, one scale and index-finger indicating the number of miles traveled, and the other scale the fractions of a mile, by means of which not only the whole distance traveled and the distance between the different stations are indicated, but by means of which the relative speed of the cars can at any time be ascertained by simply observing the time it requires the index-finger to perform the circuit of the graduated-mile dial-plate, and then from that computing the rate per hour.

To enable those skilled in the art to make, construct, and use my invention, I will now proceed to describe its parts in detail.

The apparatus is represented as being arranged in a box, A, provided with a hinged door having two openings, *y* and *z*, covered with glass—the one, *y*, to show the name of the stations in succession on the curtain, and the other, *z*, for the distance dial-plate. This box is secured at any convenient place in the inside of the car, preferably at the top of one of the corners of one of the ends of the car, so as to face the passengers; or there may be two, one at each end.

Here it may be remarked that the release mechanism and the general construction of the self-winding roll in this case are substantially the same as that described and illustrated in the patent, No. 152,385, granted to me June 23, 1874, for improvement in station-indicators, and are, therefore, here unnecessary to be particularly described, they only differing in that the self-winding curtain in the present

application is arranged in the same plane as the release mechanism instead of at right angles, as in my former patent, but which arrangement involves a somewhat different connection between the curtain and the release and arrest mechanism. It, however, renders the apparatus more compact, and brings both the dial-plate, with its index-fingers, and the curtain, with the name of the stations marked thereon, in full view of the passengers. The new connection between the curtain and the release mechanism I will, therefore, now describe.

On the left-hand end of the box, near its upper corner, is secured a bearing-plate, *a*, having a notch, *b*, cut in its front end (shown in Fig. 2ª) for the reception of the loose spindle *e*, on which the spring *e''* is wound of the self-winding curtain B. The sides of this notch are made parallel, or nearly so, in order to embrace the sides of the spindle *e*, and hold the latter firmly in place without turning, the outer end of the spindle for this purpose being notched or slotted on opposite sides, as shown at *e'* in Fig. 5. The opposite end of the curtain is mounted upon an axis, *c*, secured to that end in a bearing, *f*, made fast to the upper end of the frame D of the release mechanism. On the end of roll B, through which the loose spindle *e* projects, is secured a hinged notched catch, *d*, (shown in Fig. 6,) and which is made to engage with the slotted sides of the loose spindle *e*, which, for this purpose, is provided with an additional set of slots, *i*, Fig. 5. This catch serves to lock the spindle *e* to roller B whenever it is desired to stop the working of the latter. The end of catch *d* moves in a guide-frame, *d'*, which serves to confine it in position to the end of the roller. The self-winding roller B is free to turn on spindle *e*, and may be made in any of the well-known ways, such as that shown in Fig. 5.

Thus constructed, the fixed axis *c* is inserted into bearing *f*, and its loose slotted axis *e* inserted into the notch *b* of plate *a*, and there held firmly in place. The other roller, C, is keyed fast to, or otherwise secured to, shaft *g*, so as to turn therewith. Or, instead of a single shaft, *g*, it may be mounted upon two short axes, one at either end, which would render it more easy to remove, in which case the outer axis would have its bearing in plate *h*, and the other axis or shaft *g* in bearings *h' h''*, the first bearing, *h*, being secured to the end of the box, and the others, *h'* and *h''*, to the frame D of the release mechanism. Bearings *h'* and *h''* are made out of one plate of metal, suitably bent or swaged up for the purpose. That end of shaft *g* which has its bearing *h* at the end of the box is squared, so as to form a stem for a key to turn or wind it, and for this purpose projects through the end of the box, as shown in Fig. 2. Where that end of shaft *g* which has its bearings in *h'* and h^2 is made in a separate piece, the end that carries roller C is also squared, and a square hole for its reception cut in a plate secured to that end of roller C. That end of shaft *g* which has its bearings at *h'* and h^2 carries a miter-pinion, *l*, which meshes with a corresponding pinion, *s*, mounted on the shaft *n*, that carries the notched arrest-wheel E, and into the notch of which the detent *d*, that arrests wheel F, takes. When detent *d* rests into the notch of wheel F it will be evident that the spring of the self-winding curtain cannot turn roller B, inasmuch as the pinion *s* on the shaft *n* of wheel F will hold pinion *l* and shaft *g* of roller C stationary. The moment that detent *d* is raised out of the notch of disk F, the spring of roller B is then free to act, and thereby causes the latter to turn and wind the curtain upon it, inasmuch as roller C, with its shaft *g* and pinion *l*, is now free to turn pinion *s*, disk-wheel F, and their shaft *n*.

The release of detent *d* from the notch of disk F is effected in the same manner as in my former patent—that is to say, by the turning of the 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. Lever P, for this purpose, is mounted on a rock-shaft, P^1, which carries a cam-lever, P^2, and which actuates another lever, P^3, made fast to a rock-shaft, that has its bearings in the upper side of the frame D.

Lever P^3 in turn acts on lever N, which, being made fast to the rock-shaft N' that carries detent *d*, lifts the latter out of the notch of disk F, thereby releasing the latter, and allowing roller B to wind the curtain until disk F is checked again by the descent of the detent into the notch cut in its periphery. Detent *d* may be simply 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. In order to allow the curtain to be rewound on roller C without affecting disk F and the release mechanism, instead of mounting disk F directly upon shaft *n*, and securing it thereto, disk F is secured to the side of a gear, B, and the latter loosely mounted on the sleeve of a ratchet-wheel between the latter and a disk, 1, which is also secured to the sleeve of the ratchet-wheel. This ratchet-wheel and its sleeve is keyed fast to shaft *n*. To the side of gear E next to the ratchet-wheel is hinged a pawl, which engages with the teeth of the ratchet, as also a spring, to keep the pawl engaged with the teeth. Gear E thus mounted on the sleeve of the ratchet will therefore allow shaft *n* and the ratchet-wheel to turn in one direction without turning itself, but not in the other; and, therefore, as it carries disk F, will allow shaft *n* to turn on winding the curtain upon roller C without turning either disk or ring F and gear E. Gear E is used to impart motion through a train of gears to a buzz-wheel, in order to moderate the speed of the self-winding roller B in wind-

ing up the curtain thereon in making the change of name to indicate the next station, and are arranged in a similar manner to that shown in my former patent. G represents a large driving-gear, on whose shaft is wound the actuating-spring H of the train of gears which forms the release mechanism of the apparatus. Gear G is mounted in the usual manner of the driving-gear of a clock, and, like it, is provided with the ordinary ratchet-wheel 2 and pawl 3. Gear G drives pinion 4 on the shaft of gear I, and the latter drives the pinion 5 on the shaft of gear J, while gear J drives the pinion 6 mounted on the shaft of the escapement-wheel K. Upon the outer end of the shaft 7 of the gear I is loosely mounted the large release-wheel Q in the following manner—that is to say, loosely on a hollow spindle, 8, which in turn is mounted and secured to the shaft 7. For this purpose spindle 8 is turned down at its outer end, so as to form a shoulder, against which the rear side of the wheel Q when shipped over it may abut. Thus arranged, a ratchet-wheel, 9, is then made fast to the hollow spindle 8 on the inside of wheel Q, with the teeth of which a small pawl pivoted to the side of wheel Q engages, and is held in place by a spring, which is also attached at one end to the inner face of wheel Q, the other end bearing against the back of the pawl. A small hole is now made transversely through the outer ends of shaft 7 and spindle 8, into which a pin, 10, is inserted to connect the spindle 8 to shaft 7 and to confine wheel Q thereon. Thus mounted, disk Q is free to turn in one direction on spindle 8, but can only move with it in the other—that is to say, when shaft 7 turns, spindle 8 and disk Q must move with it.

Disk Q is provided with a series of pins, *m*, set at proper intervals apart, around and near its periphery, there being one pin for every stopping-station on the road going and returning, and one for each of its two terminal stations. For example, 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.

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 I, whose shaft 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 G—the gear-wheel on whose shaft the main-spring of the apparatus is wound—to move a distance sufficient through the pinion 4 to move the gear-wheel I one tooth, 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 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, 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.

The release mechanism and self-winding curtain being thus combined, it now becomes necessary to show the connection of the electro-magnet and battery therewith and with the running-gear of the car.

An ordinary horseshoe electro-magnet, L, is secured in any suitable manner to the inside of the box A, at a point immediately adjoining the escapement-wheel K, as shown in Fig. 2, the end 11 of the covered wire of one spool is connected directly with one of the poles of the battery M, and the other end 12 of the covered wire from the other spool connected to a metal plate, 13, secured in a box below the bottom of the car or to the side of the truck-frame of the car. Immediately below plate 13 is hinged to the side or end of the box another metal plate, 14, to which is connected a conducting-wire, 15, leading to the other pole of the battery. This plate 14 is provided with a pin, 16, at its free end, which rests or bears upon the axle W of one pair of car-wheels. This axle is provided with a cam, 17, on one side, immediately under the pin 16, so that each revolution of the wheels will cause cam 17 to raise pin 16, thereby forcing the end of the hinged metal plate 14 in contact with the stationary metal plate 13, and closing the circuit. This renders the soft-iron bars of the electro-magnet L magnetic, causing it to attract the armature O toward it. Now, as the armature O is made to form part of the verge or detent R of the escapement-wheel K, this forward movement of the armature carries the verge R with it, and allows the escapement-wheel to move forward one tooth. As soon as the cam 17 on the axle N passes from beneath the pin 16, the weight of the latter and of the hinged metal plate 14 causes the latter to drop and break the circuit, demagnetizing the soft-iron bars of the electro-magnet, and thus freeing the armature and verge from its attraction, and allowing the latter to be turned back on its pivot by the action of a small spring, 18, suitably arranged, and secured to the upper part of the frame D for this purpose, ready, when the circuit is again closed by another revolution of the car-axle, to be drawn forward with the armature, and thus allow another tooth to pass, and so on, one tooth for every revolution of the car-wheel, until, through the pinion 6 on the shaft of the escapement-wheel, sufficient motion through gear J, pinion 5, and gear I will have been communicated to shaft 7, according to the regulated number of miles, to cause disk-wheel Q at the proper time, through one of its pins *m*, to operate lever P, and thus put in action levers P^2, P^3, and N to raise detent *d* and release roller C, that the self-winding curtain B may be free to operate, and expose the name of the next station on the curtain to the view of the passengers. This done, the apparatus goes on as before, closing and breaking the circuit, and allowing a tooth of the escapement-wheel to pass for each revolution of the car-wheels until the number of teeth passed represents the exact distance between the last station and the approaching one, by which time the next pin *m*, representing the station just reached, will have been brought to bear upon lever P, and it upon the others P^2, P^3, and N, releasing roller C, and allowing the name of the next station to be exposed on the curtain by the action of the self-winding roll B as before, and so on in succession until the train reaches its terminal station.

In Fig. 7 a modification of the device for closing and breaking the circuit is shown, by which the active operation of the electro-magnet and battery is diminished in frequency. It consists in connecting wire 15 to the stationary plate 13, and the end 12 of the covered-wire coil of the electro-magnet to a spring-metal plate, 14—see Fig. 7—(each of the plates 13 and 14 are insulated from each other, as in the former case, by being secured to the wooden box or wooden timbers of the truck-frame,) and then mounting a ratchet-wheel immediately above the end of spring-plate 14. This ratchet-wheel is secured to the side of the box

or truck-frame, and is provided with any given number of teeth required, which, for the purpose of illustration, I will put at ten. I then arrange a slide-rod, 16, so that its lower end will rest or bear on the axle immediately above the cam 17. In an oblique slot cut in rod 16 is secured a spring-pawl or pivoted tooth, 19, so arranged as to engage successively with the teeth of the ratchet 20, as the rod 16 is raised by the cam 17 of the axle W. Rod 16 is made to pass through the top and bottom of the box 22, that contains the metal plates 13 and 14, and abuts at its upper end against the under side of the outer end of a spring, 21, whose other end is secured to the upper side of the box. This spring forces rod 16 down as cam 17 is withdrawn from beneath by the rotation of the axle. As rod 16 descends, its pawl or tooth 19 turns up, the slot being long enough for the purpose, until it passes the next tooth of ratchet-wheel 19, when, by the action of a spring arranged in or near the slot, it is again forced down ready to engage with it on the next ascent of slide-rod 16, and so on successively, turning ratchet-wheel 20 for a distance equal to one tooth for every rise of the rod, until the ratchet-wheel has performed a full revolution, when, by the action of a lever, 23, secured to the side of the ratchet or its hub, and which is then brought in contact with plate 14, it depresses the latter, forcing it into contact with plate 13, and thus closing the circuit, causing the armature to move the verge and allow the escapement-wheel to advance one tooth, as in the former case; but in this case, as the ratchet-wheel 20 has ten teeth, and each of these represents one revolution of the car-wheels, and as the circuit is only closed for each full revolution of the ratchet-wheel, it follows that the advance of one tooth of the wheel in this case stands in the place of ten in the first case, and, consequently, a corresponding change in the train of gears that operate the disk Q must be made, and so for any given number of teeth that the ratchet 20 may be provided with.

The metal plate 14 being a spring-plate, as soon as lever 23 has passed by the turning of the ratchet-wheel, will instantly regain its normal position and break the circuit, and will remain in this position until the wheels have again performed ten revolutions, when it will again be depressed by lever 23, and the circuit closed as before, and so on for each ten revolutions of the wheels. This plan is deemed preferable to the first.

It will be apparent that the same effect will be produced by arranging the devices so that the advance of the escapement-wheel one tooth at a time shall follow the breaking instead of the closing of the circuit, the method of doing which, in view of what has already been shown, is so apparent that it is not deemed necessary further to describe it, as such is well known to all electricians.

It now only remains to describe the mechanism for registering the distance traveled, and the method of computing the relative speed of the cars per hour.

Upon the upper end of the frame D is secured, in any suitable manner, an angular frame, S, and between that and frame D another frame-plate, T. In the lower end of the upper arm 25 of frame S, in a suitable bearing, is mounted one end of a short spindle, whose other end finds a bearing in the front side of frame D. On this spindle is securely mounted a gear-wheel, 26, provided at regular intervals apart with a tooth for every mile that intervenes between the two terminal stations; as, for instance, if the distance between the two terminal points is forty-four miles, then gear-wheel 26 would have forty-four teeth. Upon the same shaft is also firmly secured a pinion, 27, which meshes with another but loose pinion, 28, of the same size and number of teeth, and which is loosely mounted on the shaft *r* of gear-wheel J. Pinion 28 is mounted on shaft *r* by means of a barrel or sleeve, 29, to which it is brazed or otherwise secured. Sleeve 29 turns freely on shaft *r*. On the same shaft *r*, immediately below gear 26, is secured a small cam-pinion—that is to say, a pinion provided with a single tooth. This pinion and tooth are so arranged with respect to gear 26 as to engage with a tooth of the latter once for every revolution of gear J, thereby, for every such revolution, moving gear 26 forward one tooth. This motion moves pinion 27 a corresponding distance, and the latter, meshing with the same sized loose pinion 28, turns it and its sleeve 29 to the same extent.

Now, as the latter carries an index-finger, U, it will be apparent that, if gear 26 is divided into forty-four teeth, and one of these teeth is moved forward for every revolution of shaft *r* and gear J, the index U will also perform a one-forty-fourth part of a revolution, and that each of these forward movements will be consecutively indicated upon the stationary graduated dial-plate V, and which, for this purpose, will be divided into as many parts as there are teeth in gear-wheel 26. Hence if each tooth in gear 26 represents a mile, so will each mark on dial V represent a mile, and the index-finger U point at the number already traveled, reckoning from the zero-point in the direction of motion of the index-finger.

To facilitate computation, the graduations on the dial are marked with the proper numbers at suitable intervals, as is indicated on the drawings by the numbers 5, 10, 15, 20, &c.

The number which represents the extreme distance between the terminal points also forms the zero or initial point.

Now, it will be apparent that the teeth of gear J can be so rated with respect to the number of teeth in the escapement-wheel K and its pinion 6 that one revolution of the first, J, will correspond to such number of revolutions of the car-wheels as will accurately measure a mile; hence every time gear 26 is moved a tooth it will cause index U to ad-

vance and indicate that mile or movement on the dial.

Again, as gear J makes one revolution for every mile traveled, it will be apparent that an index-finger, X, secured directly to the outer end of its shaft *r*, will perform that revolution synchronously with it, and that each revolution, or part of a revolution, of that finger will represent a mile, or so much of a mile as has already been traveled, and will indicate the same upon a scale, if suitably arranged for the purpose.

This index-finger X and its scale 30 are illustrated in Fig. 1, the scale being divided into fractions of a mile to facilitate observation and calculation. In that figure the outer scale 31 and long hand U indicate the aggregate number of miles traveled, and the inner scale 30 and short hand X the additional fraction of a mile traveled.

By the fractional scale 30 and short index-finger X any passenger can, by timing the running of a mile upon it, readily compute the relative speed of the train per hour at any time, the mode of doing which is too apparent to require illustration.

I intend using a bell in connection with my apparatus to call the attention of the passengers to the instrument when a change is made from the name of one station to the next. This bell may be rung automatically by a series of pins on the side of gear E acting on the bell-lever, or it may be an electric bell, the circuit of which may be closed by the action of an arm suitably arranged and attached to the end of roller B, the same battery answering both purposes, an additional circuit-wire being merely added in the manner well-known to electricians.

It will also be evident that the self winding curtain on which the names of the stations are indicated may be operated by hand, so as to indicate the name of the next station by the aid of the electro-magnet and battery; as, for instance, by the engineer on leaving the last station, in which case the release mechanism would be dispensed with, and the armature applied to detent *d;* then the circuit-wires would be carried forward to the engine, and there operated by an ordinary circuit-key. In this case one battery would suffice for the whole train of cars, but an electro-magnet would be required for the apparatus in each car, and each of these electro-magnets connected to the circuit-wire in an analogous manner to telegraph-stations, only that the wires must form a perfect circuit.

This plan may be used with advantage; but the other mode, by which the distance traveled and the speed of the cars are ascertained, is deemed preferable.

The use of a stationary indicating-curtain as an advertising medium is intended to form the subject-matter of a separate application for a patent by me, and is therefore not here further alluded to or described.

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

1. The combination of the electro-magnet L and battery M with the axle of a car or other public conveyance, and with the release mechanism of a self-winding curtain of a station-indicator, constructed substantially as and for the purpose set forth.

2. In combination with the release mechanism of a self-winding curtain, operating as a station-indicator, the dial-plate V, with its two graduated scales, and the index-fingers U and X, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own invention, I affix my signature in presence of two witnesses.

JAMES F. KETTELL.

Witnesses:

F. C. BIRNBAUM,

S. B. WHEELER.