(No Model.) 3 Sheets—Sheet 1.

A. B. MURRAY & H. G. KRASKY.

RAILWAY STREET AND STATION INDICATOR.

No. 537,300. Patented Apr. 9, 1895.

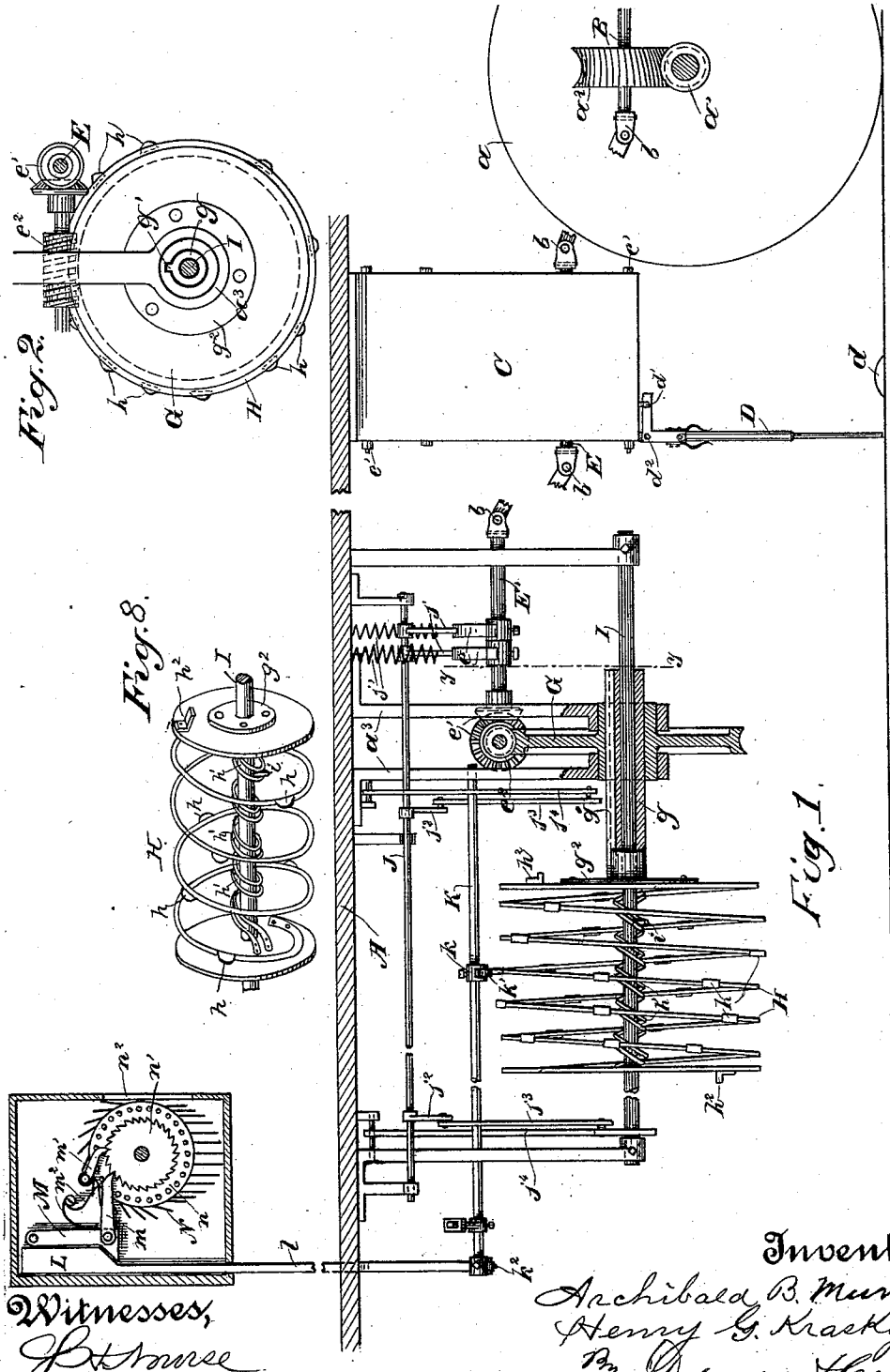

Fig. 2.

Fig. 8.

Fig. 1.

Witnesses,
S. Whitmore
H. F. Ascheck

Inventors.
Archibald B. Murray,
Henry G. Krasky
By Dewey & Co
Attys

(No Model.) 3 Sheets—Sheet 2.

A. B. MURRAY & H. G. KRASKY.

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Fig. 3.

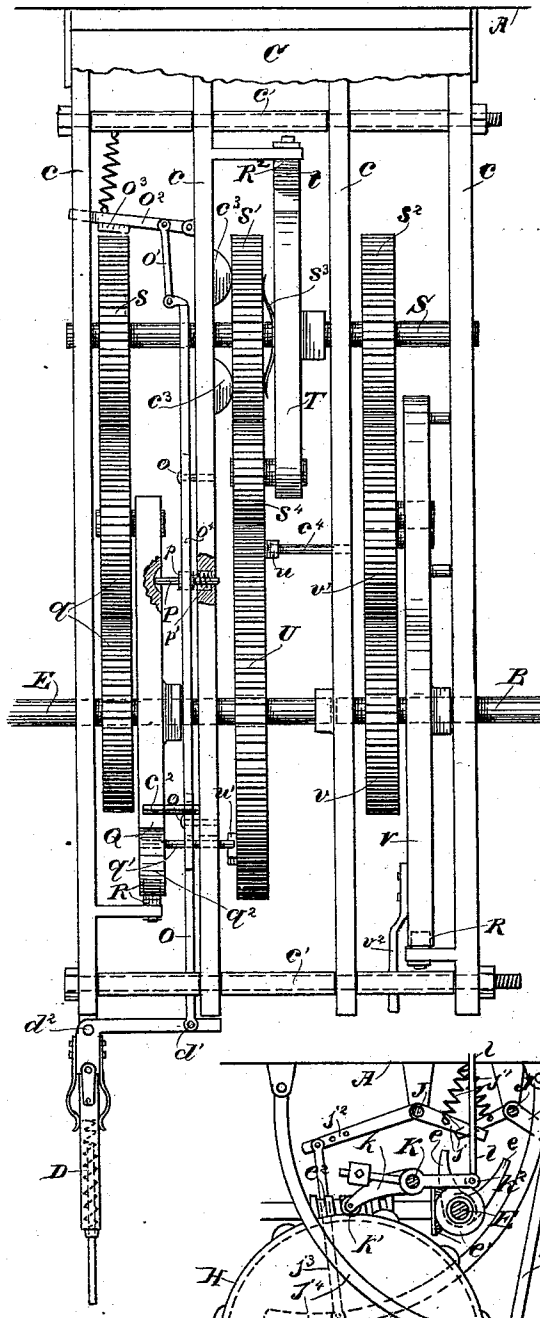


Fig. 9.

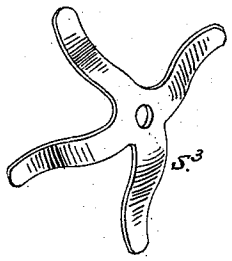
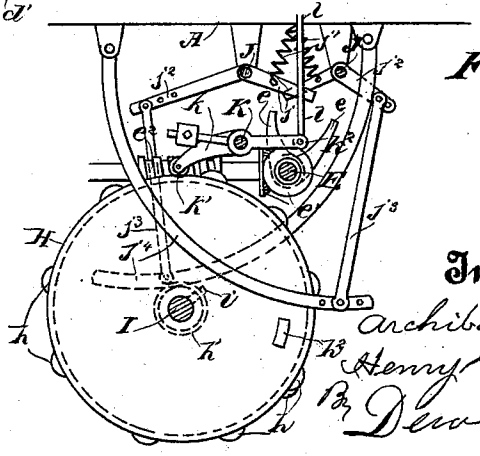


Fig. 4.



Witnesses,
H. F. Ascheck

Inventors,
Archibald B. Murray
Henry G. Krasky
By Dewey & Co.
Attys

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Fig. 4.

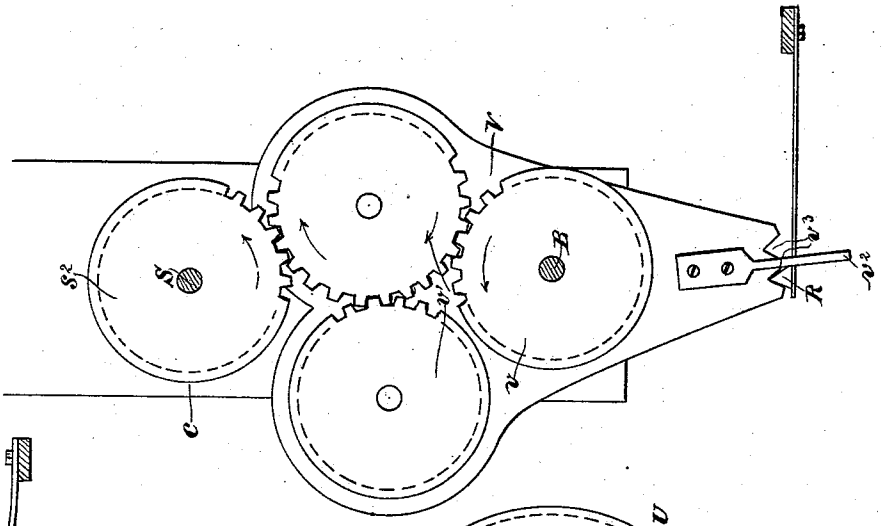


Fig. 6.

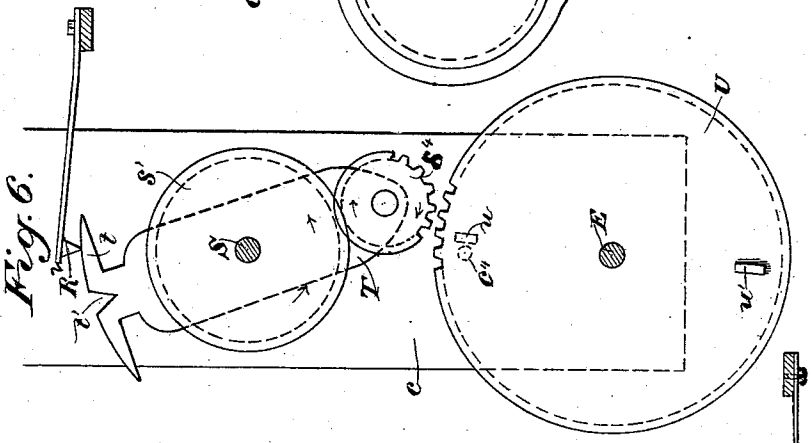
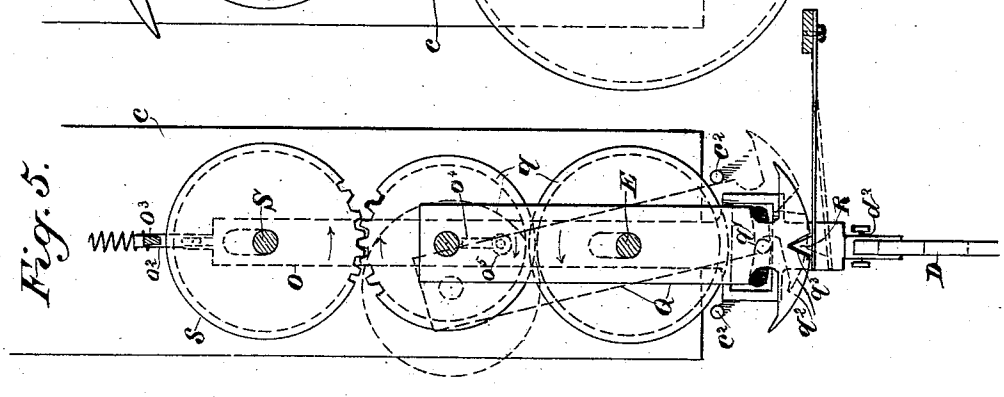


Fig. 5.



Witnesses,
R. F. Howse
H. F. Ascheck

Inventors,
Archibald B. Murray,
Henry G. Krasky,
By Dewey & Co
Attys

UNITED STATES PATENT OFFICE.

ARCHIBALD B. MURRAY, OF SAN RAFAEL, AND HENRY G. KRASKY, OF SAN FRANCISCO, CALIFORNIA.

RAILWAY STREET AND STATION INDICATOR.

SPECIFICATION forming part of Letters Patent No. 537,300, dated April 9, 1895.

Application filed July 23, 1894. Serial No. 518,385. (No model.)

To all whom it may concern:

Be it known that we, ARCHIBALD B. MURRAY, residing at San Rafael, Marin county, and HENRY G. KRASKY, residing in the city and county of San Francisco, State of California, citizens of the United States, have invented an Improvement in Railway Street and Station Indicators; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to a street and station indicator to be applied to railway cars.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a part of the apparatus. Fig. 2 is a section taken through *y*—*y* of Fig. 1. Fig. 3 is an enlarged view of the reversing mechanism. Fig. 4 is a view showing the end of the spiral plate or disk, and connecting mechanism for stopping the end movement of the disk. Figs. 5, 6 and 7 are enlarged detail views of the three trains of gearing shown in Fig. 3. Fig. 8 is a perspective showing the plate or disk H. Fig. 9 is a detail of the spring s^3.

The object of our invention is to provide a means for accurately indicating streets or stations which are being passed by a railway car, and to reverse the operating mechanism so that upon the return, the same streets will be properly indicated.

a is one wheel of the car mounted upon an axle and having a worm or screw a' fixed to the axle, adapted to engage the worm gear wheel a^2 so as to drive the shaft B. This shaft is coupled with a section passing into a closed case C which contains the reversing mechanism to be hereinafter described, either directly, if the parts are in line, or, as shown in the present case, by means of a connecting rod and universal joints *b b*.

Upon the opposite side of the case C, the shaft E which is journaled in line with B within the case, is coupled, if not in line, by another connecting rod and universal joints, with a shaft E′ which is suitably journaled in a frame-work connected with a portion of the car, as shown in Fig. 1.

a^3 are arms extending downwardly and having a hole made through the lower ends, forming a journal-box in which turns the hub of a worm gear G. This gear is driven by a beveled gearing e' formed by a pinion upon the end of the shaft E′, and a corresponding one upon a shaft journaled transversely to E′. Upon this transverse shaft is a worm e^2 which engages the worm gear G, and rotates it when the shaft E′ is in motion.

The hub of the worm gear G fits upon a sleeve *g* which is fitted to rotate upon a stationary shaft I, and the sleeve and the hub of the worm gear are connected by a feather g' which allows the sleeve to be rotated by the rotation of the gear wheel. At the same time it is movable longitudinally upon the shaft I.

H is a plate or disk arranged spirally around the shaft I, and at one end it is connected with the rotating sleeve *g* by means of a plate g^2 which is bolted to the end of the spiral disk.

Around the shaft I is a spiral guiding track h' carried by the plate or disk and the interior of the spiral disk is cut away, so that it leaves an open space surrounding this spiral guide from end to end of the turns of the spiral disk H.

i is a pin projecting from the stationary shaft I and entering the guide slot h' so that when the spiral disk is rotated by the action previously described, it will also be caused to advance, and as the sleeve G is slidable upon the shaft I, the spiral disk will be allowed to advance along the shaft to any desired extent while it rotates. Upon the periphery of this spiral are protuberances *h* which are fixed to the periphery of the spiral at such points as will indicate the streets or stations which are to be passed by the car. The distance between these protuberances will depend upon the distance apart of the stations or streets, and they may be quite irregular. These protuberances pass beneath a lever arm *k* which is fixed to a shaft K parallel with the shaft I, and rotating in suitable bearings in suitable arms depending from the car body frame. The end of the lever *k* has an anti-friction roller k' upon it which travels over the protuberances *h*, and when one of these pro-

tuberances passes beneath it by the rotation of the spiral disk H, the lever arm k will be raised.

Upon the opposite side of the shaft K, and at a suitable point with relation to the indicator, is another lever arm projecting in the opposite direction, shown at k^2, and the end of this lever arm is connected with the rod l which extends upward into the indicator case, and there connects with a bar L having an inclined face at the junction of the two as shown.

Whenever the movement of the lever arms k, k^2 takes place, by reason of the arm k passing over one of the protuberances upon the spiral disk, this part L will be pulled downward, and its beveled lower end will act upon a corresponding bevel at the lower end of a swinging arm or link M, which carries a pawl m, and the latter engages with a toothed ratchet m' so that the downward movement of the bar L acts to force the ratchet m forward and rotate the ratchet wheel a fixed distance. As soon as the lever arm k has passed a protuberance, it falls again upon the periphery of the spiral disk, either by the action of a spring, or of a weighted lever arm which insures its movement, and this raises the sliding bar L and allows the pawl m to be returned by the action of a spring m^2. A holding pawl m' prevents the return of the ratchet wheel n'. This ratchet wheel is mounted upon a shaft which has upon it a drum n, and the drum has hinged to it plates N adapted to fold back upon the drum while passing up on the rear portion, and when they arrive opposite the opening n^2 which is made in the front of the case, they will turn about their hinges one at a time and drop down so as to expose the name of the street or station in front of this opening, where it is visible to the passengers. This continues as long as the car is moving in one direction, and the length of the spiral flange H is so calculated that it will rotate so as to have brought all of the protuberances h beneath the lever arm k, and will thus have indicated all the stations or streets when the car has reached the end of its run. The spiral terminates at this end as at the other, in a flat disk, which has upon it a projection h^2.

Above the shaft K is a shaft J journaled, as shown, and having fixed upon it near the end where the spiral has finished its movement along the shaft I, a crank arm j^2. This crank arm is connected by a rod j^3 with a curved arm j^4, one end of which is hinged near the lower part of the car, and the other extends down so that when the spiral has advanced far enough to have completed its course, the projection h^2 upon it will come in contact with the curved arm j^4 and moving it up, will push the arm j^2 so that it will rotate the shaft J a short distance in its bearing. Upon the opposite end of the shaft J, is an arm j which is correspondingly depressed by the partial rotation of the shaft.

The shaft E′ has fixed upon it an arm e which continues to revolve with the shaft as long as the apparatus is in operation, but as soon as the lug h^2 has acted, as previously described, to rotate the shaft J and force the arm j down into the path of the arm e, the latter will be stopped, and with it the rotation of the shaft E′ and all the connected parts for operating the indicator which have been previously described.

When the mechanism is reversed to travel in the opposite direction, a lug h^2 upon the opposite end of the spiral acts in the same manner when the car reaches its destination. When this stoppage of the shaft E′ takes place, it will be necessary to immediately disengage this shaft from the shaft B which is driven from the car axle, and which continues its motion as the car continues. This disengagement takes place as follows:—Within the casing C, a gear wheel q is fixed upon the shaft E, and this engages a corresponding gear q journaled in an arm Q which is turnable about the shaft E. The lower end of the arm Q which extends downward below the shaft E, as shown in Fig. 5, has a segmental end q^2, and a notch q^3 which is engaged by a spring pawl R. This holds the bar Q normally in a vertical position so that the middle gear q engaging the lower one, also engages an upper gear s which is fixed upon the shaft S in direct line above, so that the three gears stand in line and are in engagement with each other. As soon, however, as the shaft E′ is checked by the action previously described, the continued motion of the shaft B turns the intermediate gearing v', s^2, shown in Figs. 3 and 7, thus continuing the motion of the shaft S and this driving the upper gear-wheel s, acts to rotate the middle gear q, but as the lower part of this gear is locked by reason of the lower gear q being fixed to the shaft E which has been stopped as before described, the action of the upper gear s will be to push the middle gear q to one side, causing the arm Q, in which it is journaled to turn about the shaft E, and the pawl R by reason of its V shape, will be thus forced out of the notch q^3, and this will allow the arm Q to be turned around the shaft E until the middle gear q has moved out of contact and engagement with the upper gear s as shown in the dotted lines in Fig. 5. The car having reached the end of its travel is now ready to return. It may return in either of two ways, first, by going back in the reverse direction without turning around, in which case the motion of all the parts will be in the opposite direction, and the indicator will show the streets or stations upon the return trip in the same manner as when going out, and, secondly, by being turned around either upon a turntable, or by passing around a loop.

In the second case, where the car is turned around, the mechanism by which motion is transmitted from the shaft B to the shaft S, must be reversed. This is done as follows:

V is a plate which is fulcrumed to turn about the shaft B. This plate has journaled in its upper end the two gears v' which mesh with each other, and one of the gears v' constantly meshes with the gear v upon the shaft B. When the plate V is tilted to one side, the gear v engages one of the gears v', and the latter engages the gear s^2 on the shaft S, thus driving the shaft S in one direction. This may be the position of the gearing while the operations heretofore described take place, but if the car is to be returned, it will be manifest that the rotation of the shaft S and all the other connecting mechanism must be reversed, in order to return the spiral disks H in the reverse manner from which they had been moved while the car was on its outward trip. This is effected by simply turning the plate V until the left hand intermediate gear v' is thrown into contact and engagement with the gear s^2, and the right hand gear v' is thrown out of engagement with s^2. The motion is then transmitted from the gear v to the right hand gear v', thence to the left hand gear v' with which it is constantly in mesh, and thence to the gear s^2, and by thus interposing another gear which had been previously an idler, the motion of the shaft S and all other connections will be reversed, and the disks H turning in the opposite directions will be moved back to the point of starting, thus indicating the streets in the reverse manner from what they were indicated when the car went out. The plate V is locked in either of these positions by means of notches v^3 which are engaged by a spring pawl R′ and the plate may be tilted as previously described, so that the pawl will engage either of the notches by means of the hand lever v^2. If the car is not turned around, but returns in the reverse direction, the plate V need not be disturbed, as all the gearing will be moved in the reverse direction by the return of the car. When the car starts to return, it is necessary to throw the intermediate gear q again into engagement with the gear s and this is effected as follows: s' is a gear-wheel mounted upon the shaft S, and engaging a pinion s^4 which is journaled in the end of a swinging arm or plate T, the upper end of which has a curved arc t notched in the center, as shown at t', and adapted to be engaged when in a vertical position by a V-shaped pawl R^2 which will hold it in this position with a certain amount of force, but by reason of its V-shape it can be thrown out of the notch so as to allow the arm T to swing to one side when any considerable pressure is brought upon the arm. The position of the arm T is normally, as shown in Fig. 6, where it is turned to one side to such an extent that the intermediate gear s^4 is out of engagement with the gear-wheel U which is loose upon the shaft E, but the gear s^4 always remains in engagement with the gear s' because the arm T turns about the shaft of this gear as a center of rotation. The pressure of the point R^2 upon the surface of the segment t is sufficient to hold the gear s^4 out of engagement with the gear U while the car is running in one direction, but as soon as the shaft S has reversed, as previously described, the pressure of a spring s^3 (which is shown in Figs. 3 and 9) acting against the gear s' presses it against the protuberances c^3 fixed to the vertical plate c as shown. The spring s^3 simply exerts a pressure against the gear s' which will produce enough frictional resistance to cause the gear to be turned when the shaft is reversed. The pressure of the ends of the spring arms against the gear will always act to turn it in either direction when the motion of the parts is reversed and will overcome the friction of the pawl R^2 upon the segment t. This elastic pressure of the spring s^3 is sufficient when the gear s' is turned in the opposite direction, as previously stated, to rotate the arm T until the pawl R^2 falls into the notch t' and locks it, and the gear s^4 will then be in engagement with the gear U. The gear U which had previously been an idler upon the shaft E, is now rotated upon the shaft E.

Projecting from one side of the gear U is a lug u', and this lug coming in contact with the pin q' which is fixed to the oscillating arm Q, will force this arm (which, as previously stated, had been thrown into the position shown in dotted lines in Fig. 5) back into its vertical position (as shown in full lines in that figure) and this again engages the intermediate gear q with the upper gear s on the shaft S, so that the parts are again ready for operation. This movement carries the projection u' a partial revolution, and a second projection u on the opposite side of the gear U comes in contact with the stop c^4 which arrests a further motion of the gear U, and as the movement of the gears s' and s^4 continues, it will be seen that the latter will be caused to travel out of engagement with the gear U, and this will disengage the pawl R^2 from the notch, and cause the arm T to swing into the inclined position shown in Fig. 6, which is its normal position while the apparatus is in operation. The parts are now in position to return and register in this opposite direction in which the car is moving.

If it is desired to reverse the parts for the return of the car automatically and without using the lever arm v^2 it may be effected by means of an arm D which projects downwardly and is adapted to make contact with a lug or projection d upon the turntable, or at the point where the car is reversed for its return. This arm D is pivoted to a bell crank lever which is fulcrumed at d^2, and it has elastic springs upon each side which press against it with sufficient force to allow it to actuate the bell crank lever, but which would allow it to yield in case of some large unexpected obstruction. The bell crank lever has its opposite arm connected at d' with a plate O extending up so as to fit over the shafts E and S. This plate O is slotted vertically at these points so that it is allowed a certain

amount of movement up and down. The plate is connected at its upper end by means of a link O′ with the lever arm O^2 which carries a pawl O^3. A spring connected with this lever arm O^2 normally retains it in position so that the pawl O^3 is out of engagement with the gear *s*, but when the plate is drawn down by the action of the arm D and the bell crank lever, it will be temporarily thrown into engagement with the gear *s* and this will stop the movement of the shaft S. As soon as this occurs, the continued movement of the shaft B, acting through this gear *v*, will cause the gear *v′* which is engaged with the gear s^2 to move along over the teeth of s^2 (which remains temporarily stationary with the shaft S). This disengages the pawl R′ from the notch v^3 with which it is then engaged, and allows the plate V to swing about the shaft B so that one of the gears *v′* will be disengaged from s^2 and the other thrown into engagement with it, which reverses the mechanism automatically.

In order to retain the plate O normally in its position we have made a hole O^5 through the plate which has an extension O^4 upwardly and of narrower diameter, resembling in shape a key-hole. Through this opening O^5 passes a pin P having an enlargement *p* of a diameter to fit the hole O^5. By means of a spiral spring *p′* this pin is held normally so that the enlarged portion *p* remains in the opening O^5, and this serves as a lock to prevent the plate from being moved.

The swinging plate Q which carries the middle gear *q* has an indentation made in its face just opposite the end of the pin P, so that when the plate Q is in its normal vertical position, this indentation or depression receives the point of the pin P. As soon as the plate Q is turned to one side by the operation of the mechanism, when the end of the registering spiral has been reached, as previously described, the pin P will be forced out of the depression, and will rest against the side of the plate Q, and in doing this it will force the enlargement *p* out of the hole O^5, and this will leave the smaller portion P of the pin in line with the slot O^4, and as the pin is small enough to allow the slot to move over it, it will be seen that whenever the lever D is acted upon by the projection *d* on the track, the plate O can then be pulled down so as to lock the gear *s*, and the operation just previously described will take place.

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

1. In a street or station indicator, a shaft and a worm gear by which it is driven from the axle of the moving car, a shaft parallel therewith having a sleeve slidable thereon, and a spiral disk connected and movable with said sleeve, means for rotating the sleeve and spiral upon the shaft, and a spiral guide by which the spiral disks are advanced during the rotation.

2. In a street and station indicator, a shaft driven from the car axle, a second fixed shaft parallel therewith having a sleeve turnable thereon, and a spiral disk connected with the sleeve, a spiral guide fixed upon a shaft and a pin from the shaft traveling in said guide whereby the rotation of the disk advances it along the shaft, a worm gear-wheel mounted upon the sleeve with a feather which allows the sleeve to advance within the hub of the gear, and an intermediate gear and screw mechanism by which power is communicated from the driving shaft to the worm gear-wheel sleeve and spiral disk.

3. In a street and station indicator, a spiral disk and collar mounted upon a stationary shaft with a guide and mechanism whereby the disk is rotated and simultaneously advanced along the shaft, protuberances formed upon the periphery of the disk corresponding with the locations of the streets or stations to be indicated, and an indicating mechanism consisting of a drum or cylinder carrying plates with the names of the streets or stations thereon, a shaft with a lever adapted to engage the protuberances upon the periphery of the spiral, and intermediate mechanism between the shaft and the indicator whereby the latter is actuated to expose the names of the streets or stations.

4. In a street or station indicator, a spiral disk and mechanism whereby it is rotated and advanced upon a stationary shaft by power derived from the rotation of the car axle, protuberances upon the periphery of the disk, a lever adapted to travel in contact with the periphery of the disk and to be raised whenever it passes over one of the protuberances, a corresponding lever upon the opposite side of the fulcrum shaft, a plate with which said lever is connected having its lower end beveled or inclined, and a pawl and ratchet mechanism actuated by the vertical movement of said inclined plate, and a drum or cylinder carrying hinged plates having marked thereon the names of the streets or stations which are successively exposed by the rotation of the drum when actuated by said pawl and ratchet mechanism.

5. In a street or station indicator, an indicating mechanism, a spiral disk mounted upon a stationary shaft and mechanism by which it is rotated and advanced by motion derived from the rotation of the car axle, with protuberances upon the periphery of the disk whereby the indicator mechanism is actuated whenever a street or station is approached, a lug fixed to the end plate of the disk and a lever mechanism with which said lug makes contact when the disk has reached the end of the route, and a stop mechanism connected therewith whereby the driving shaft is arrested and the movement of the spiral disk is stopped.

6. In a street and station indicator, the indicating mechanism, the spiral disk having protuberances upon the periphery correspond-

ing with the location of the streets or stations, a mechanism actuated by said protuberances whereby the indicator is advanced to show the name of the street or station, mechanism connected with the car axle whereby the spiral disk is rotated and advanced upon a stationary shaft, a gear mechanism intermediate between the car axle and the spiral disk, a lug upon the terminal plate of the disk, a lever mechanism which is engaged by the lug when the disk has reached the end of its travel, a stop actuated by said mechanism to engage and arrest the driving shaft and a mechanism whereby the gears are thrown out of engagement so that the car axle and its attachments may continue to revolve without affecting the registering mechanism.

7. A mechanism for actuating the street and station indicator consisting of gears driven from the car axle, a shaft S having a gear fixed upon it rotated from said axle, a gear-wheel *s* fixed upon said shaft and rotating with it, an independent shaft E having a gear-wheel mounted upon it, an intermediate gear-wheel through which motion is transmitted from the gear-wheel *s* to rotate the shaft E, a fulcrum arm Q in which the intermediate gear is journaled, said arm being movable about the shaft E, a locking mechanism by which it is normally held so that the gears engage, said mechanism being disengaged and the arm turned to one side when the indicating mechanism is arrested so that the intermediate gear-wheel is thrown out of engagement with the gear *s* and the latter allowed to continue its rotation.

8. In a street and station indicator, the combination, with an indicator and means for imparting motion thereto, of a disengaging driving gear consisting of the gear wheel *s*, the lower gear *q*, a gear interposed between said lower gear and the gear wheel *s*, and a swinging arm in which said middle gear is journaled, and means for again throwing the gears into engagement, consisting of the gear wheel U on a drive shaft, a gear wheel on a second shaft and adapted to swing about said second shaft, a gear wheel carried by the arm and interposed between the gear wheel on the drive shaft and second shaft, projections upon the drive shaft gear, and the stop pin in the path of said projections.

9. In a street and station indicator, the mechanism for arresting or reversing the motion of the indicator, actuating devices consisting of the gear-wheel *v* mounted upon the shaft which is driven from the car axle, a gear-wheel s^2 mounted upon a shaft S, the intermediate gear-wheels *v'* mounted upon a plate V so as to engage with each other, said plate being fulcrumed to turn about the shaft of the gear wheel *v* so that the gear-wheels *v'* may be disengaged from the gear-wheel s^2 or either of them engaged therewith to drive the following mechanism in one direction or reverse it, and means for operating said plate.

10. In a street or station indicator, mechanism for arresting and reversing the movement of the indicator, consisting of the plate V fulcrumed to turn about the driving shaft B, the gear *v* fixed upon the shaft B, the gears *v'* with one of which the gear *v* is constantly engaged, while the two gears *v'* engage each other, a gear s^2 fixed to the shaft S and adapted to be engaged by either one of the gears *v'*, a latch R' by which the plate V is held with either of the gears *v'* engaged with s^2, an arm D projecting downwardly, a projection *d* fixed at the point where the car is to commence its reverse movement, and adapted to engage the arm D, a bell crank lever and vertically sliding plate actuated by said arm, and a latch O^2 by which the gear *s* and the shaft S are temporarily arrested so that the plate V will be shifted about its fulcrum to disengage one of the pinions *v'* and throw the other into engagement with the gear s^2.

11. In a street and station indicator, the pawl O^3 adapted to engage the pinion *s* and normally held out of contact therewith by a spring, an arm extending downwardly and adapted to make contact with a fixed projection on the line of its travel on the track, a bell crank lever actuated by said arm, a plate extending upwardly and adapted to draw the pawl into contact with the gear when the arm is acted upon, a locking and releasing device for said plate, consisting of the pin P having the enlargement *p*, a key-hole shaped slot within a larger portion of which the enlargement normally rests, a depression in the swinging plate Q in which the end of the pin rests while said plate is in its normal position, and from which it is forced when the plate swings to one side whereby the smaller part of the pin P is brought into line with the narrow slot in the movable plate O, so that the latter may be moved down and the pawl engaged with the gear.

12. In a street and station indicator, the combination, of an indicator, means for operating the same, means for arresting the motion of the indicator, the swinging plate T, and means for returning the same to its normal position consisting of the gear wheels *s'* and U and the intermediate gear s^4, the springs s^3 interposed between the swinging plate and the gear wheel *s'*, and frictional protuberances contiguous to the opposite side of the said gear *s'* against which the gear is pressed by the action of said spring.

In witness whereof we have hereunto set our hands.

ARCHIBALD B. MURRAY.
HENRY G. KRASKY.

Witnesses:
S. H. NOURSE,
H. F. ASCHECK.