(No Model.) 2 Sheets—Sheet 1.

G. DE C. O'GRADY & J. R. COLLINS.

STATION INDICATOR.

No. 501,096. Patented July 11, 1893.

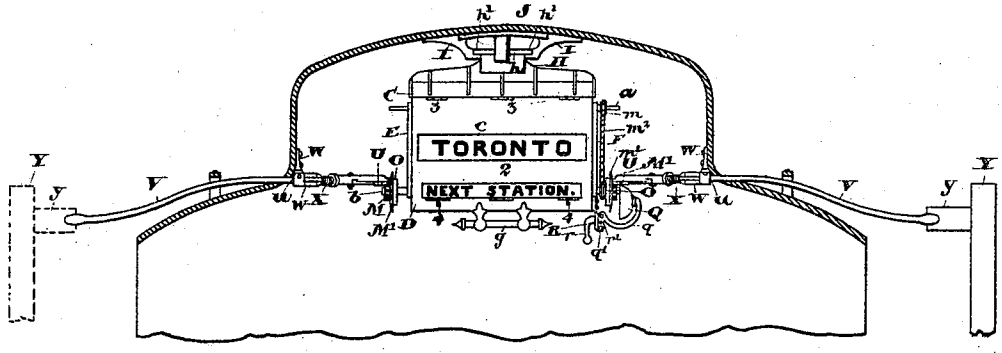

Fig. 1.

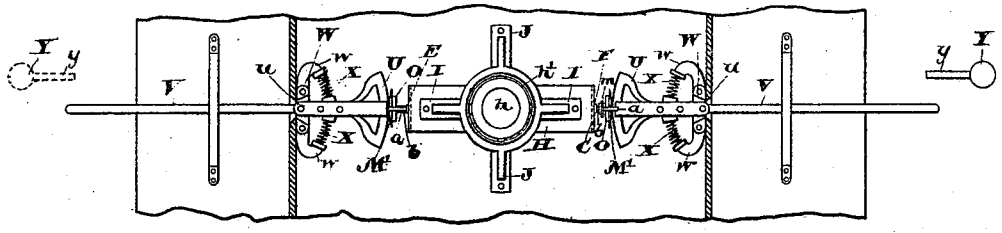

Fig. 2

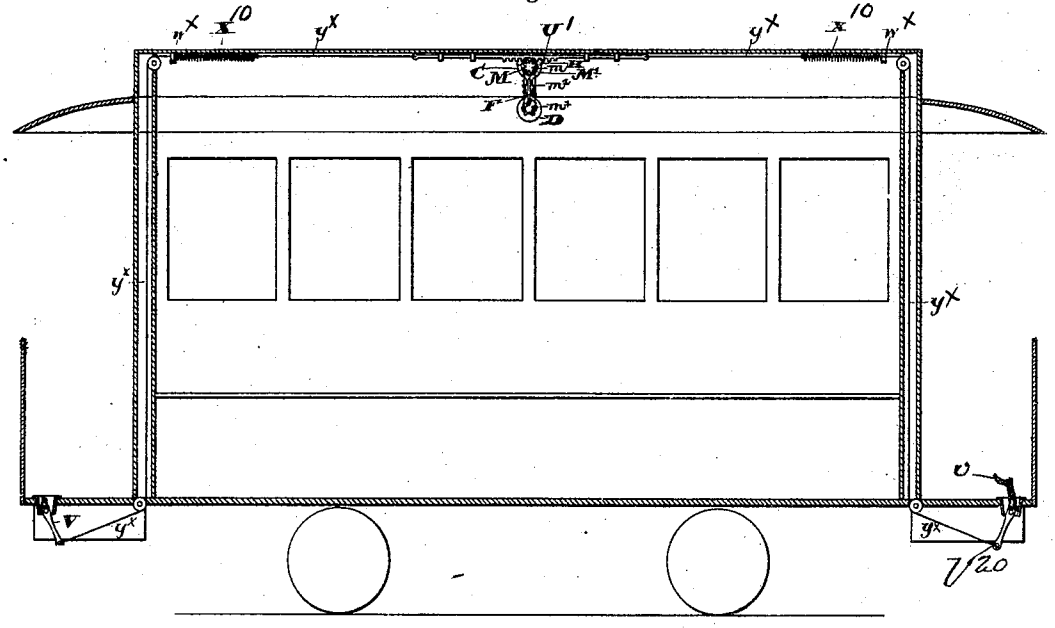

Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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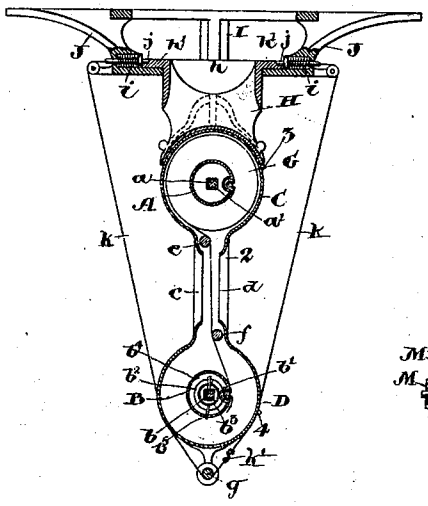

Fig. 4.

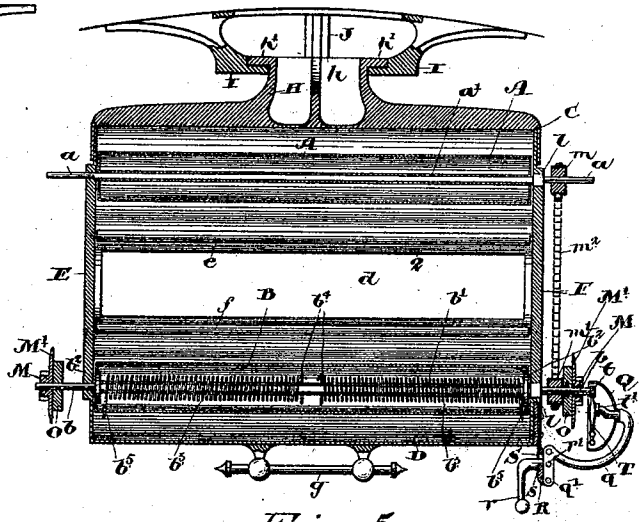

Fig. 5.

Fig. 5a.

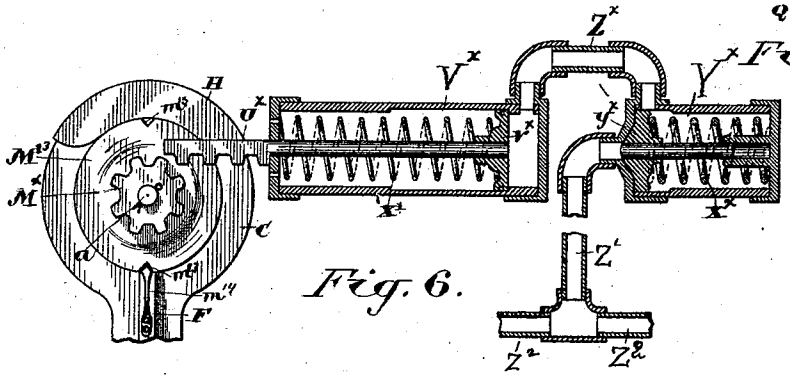

Fig. 6.

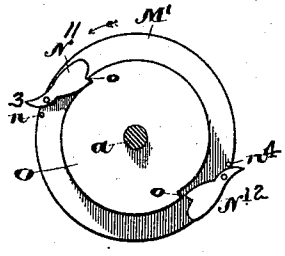

Fig. 9.

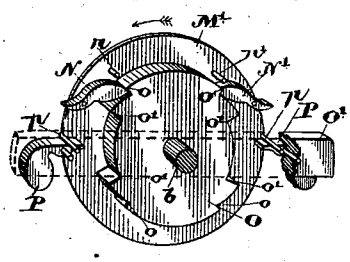

Fig. 7.

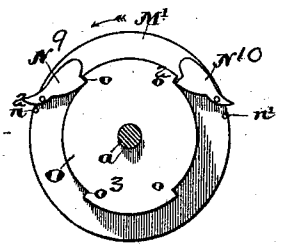

Fig. 10.

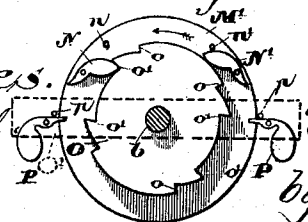

Fig. 8.

Witnesses.
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UNITED STATES PATENT OFFICE.

GERALD DE COURCY O'GRADY AND JOHN ROBINETTE COLLINS, OF TORONTO, CANADA.

STATION-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 501,096, dated July 11, 1893.

Application filed November 28, 1891. Serial No. 413,436. (No model.)

To all whom it may concern:

Be it known that we, GERALD DE COURCY O'GRADY, bank inspector, and JOHN ROBINETTE COLLINS, mechanic, both of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Station and Street Indicators, of which the following is a specification.

Our invention relates to station indicators of that class in which a band carrying the names of the stations is mounted upon rollers, and thereby is made to pass in front of an aperture, or is by movement from one roller to another, exposed to view, and in which an automatic or other mechanism is provided for giving the necessary step-by-step movement to the said band. Our indicator is shown in connection with mechanism by means of which so called automatic movement is provided, that is to say, an arm or lever is arranged upon the car to come in contact with a post or other stop in the line of movement of the said car.

Our invention relates more particularly to the construction of the case, the arrangement of the rollers and their spindles therein, and the mechanism for conveying motion to the rollers for moving the band.

It consists in the various constructions of the parts, subordinate to the general principle of the indicators above referred to.

Our invention is illustrated in the drawings hereunto attached and hereinafter referred to particularly, in which drawings—

Figure 1 is a sectional elevation of the top portion of a railroad car showing the means whereby our indicator may be operated automatically. Fig. 2 is a sectional plan of the upper portion of our car with the roof removed. Fig. 3, is a longitudinal section of a street car showing the means of operating our indicator from the driver's foot. Fig. 4 is a cross sectional elevation of our indicator and the supporting frame. Fig. 5 is a longitudinal section through the casing and supporting frame. Fig. 5ª is an inside view showing the bell hammer and gear pinion for operating the same. Fig. 6 is a longitudinal section through the air cylinders showing the means whereby it may be driven pneumatically. Fig. 7 is a perspective detail of the form of ratchet wheel and dogs, which we employ when the indicator is designed to be worked automatically. Fig. 8, is an inside view showing the second position of ratchet wheel and dog shown in Fig. 7. Fig. 9 is a detail of the form of the ratchet wheel which is designed to be worked automatically. Fig. 10 is a detail of the form of ratchet wheel designed to be operated by hand or foot power.

In the drawings the case in which the band carrying rollers are mounted, is shown as suspended from the roof of the car, in central position. The rollers are connected, and operate together.

In the principal form shown, the mechanism is operated by a pivoted arm V, which extends laterally into range with a stop fixed by the roadside, in proper position in relation to the station. The arm is capable of movement from a central normal position to the right and left, and is returned to, and held in said normal position, by a spring or springs. The inner end of the arm carries a segmental rack having its teeth upon the under side engaging with a pinion, which, as the arm is swayed to right or left, is turned in one direction or the other, and as the arm instantly passes the stop and returns to normal position, it brings the pinion to that position also, immediately after every movement. The pinion carries a pawl working ratchet wheel of special construction, which requires two complete movements of the arm to effect a complete movement of the band, from one section mark to another. The pawl and ratchet wheel are also adapted to work in the same manner, in opposite directions, as required for the to and fro movement of the car.

The casing containing the rollers and band is shown more fully in Figs. 4 and 5. It has upper and lower, nearly cylindrical shells connected by an intermediate apertured thin shell as shown clearly in Fig. 4. In the cylindrical parts are upper and lower hollow rollers A, and B each provided with axial sleeves square in cross section, marked a' and b' respectively, in which are placed the square spindles a and b whereby the rollers are supported and turned. The ends of the spindles have cylindrical journals borne in the end

walls E and F. The bearings at one end are made removable so that they may be drawn out when the spindle is withdrawn, and the opening in the wall in which they are set, is large enough to allow the square part of the spindle to pass when the roller is to be removed. The spindles extend beyond the end walls, and are provided with sprocket wheels m, m' connected by a chain m^2. The upper roller is thus connected positively with the spindle and turns exactly with it. The lower roller B is journaled on bearings b^2 independently of its shaft or spindle, and is connected thereto by means of springs b^3, connected to the lugs b^4 on the sleeve, at their inner ends and to the roller (at b^5) on their outer ends. The springs operate equally in either direction and are under their greatest tension when the band is upon one roller only and under least, when the band is equally upon both. These springs hold the band between the supporting roller e and f and in front of the apertures c and d, always under tension. It will be understood that the ends of the band are connected to the rollers, under proper tension. The apertures are upon and the band visible from both sides of the case.

In the form shown in Figs. 1 and 2 the arm or lever V is arranged to operate the mechanism. It is pivoted at u, on the bracket W, and in the side of the top of the car, and the free end extends laterally into range with a stop y on the post T. Upon the inner end of the arm v is the quadrant U having teeth underneath its edge meshing with those of a pinion M. The arm is held in central or normal position E by springs X between the ends of arms w on the bracket W and the sides of the arm. The pinion M is held and turns freely on the spindle b. It has a flange M' on which are pivoted pawls N N' placed reversely to each other, and arranged to act in opposite directions upon a ratchet wheel O, which is fixed on the spindle b by the inner side of the flange M', so that the pawls bear on the periphery of the ratchet wheel. This wheel O has ratchet teeth on opposite sides, arranged in opposite directions, combined with the oppositely arranged pawls, whereby either forward or reverse movement of the pawl carrying flange of the pinion M, will operate the said roller. There are four sets of teeth, each set (of two) marked o, and o'. Between the teeth o and o are high parts of the wheel and between the teeth o', o' are low parts, the low parts and the high parts being opposite each other, respectively. The purpose of the second tooth o' is explained hereinafter. The teeth are so arranged, in their relation to the other parts, that a single throw of the arm V caused by contact with the stop, will cause the wheel O to be turned (in direction of arrow) from the point of the pawl N' in Fig. 7, one half revolution, less the distance between the teeth of the pair o, o'. The position of the wheel O after the first movement of the arm, from and to its normal position, is shown in Fig. 8. The position of the wheel shown in Fig. 8 is the normal position of the wheel, as it is the position occupied in the space between stations, as hereinafter explained. The pawl N readily passes the weighted dog P which is pivoted upon a supporting bar O' and is held by a pin p in said bar. On the return of the arm and with it the pawls, the pawl N' will ride directly back and will remain as shown in Fig. 8, on the high part between the teeth o, o, on the upper side of the wheel. The pawl N' will be tripped in its movement by the dog P and as its outward movement is limited by the pin n, it will drop into position shown in Fig. 8. In the next direct movement caused by a second stop immediately succeeding the first, pawl N' will move in the direction of the arrow, and be inoperative until it reaches the position of tooth o' next in its path, and then it will push this tooth to the position shown in Fig. 7, or a complete half revolution, and the second retraction of the arm returns the pawls also to their normal positions, the pawl N being lifted by the dog over the tooth o'. These two movements of the arm V move the band one step, and display another station name, and also leave the mechanism in normal position. The wheel O is locked in position, but is ready for another movement of the band. The weighted dogs are duplicated, as shown, for reverse movement of the car.

In further explanation of the position of the stop posts, in connection with the construction above disclosed, it will be noted that one is required on each side of the station g, for the reason that without the special construction of ratchet and duplication of stop posts, the indicator would operate on the wrong side of the station, when the train moves in one direction. A post is required therefore on each side, so that the next station will be brought to notice as soon as the train leaves the preceding. For this reason the extra set of teeth heretofore described, is provided, and when the car approaches a station, the first stop post, passed as the car goes into said station, acts only on the tooth o' and does not cause sufficient movement to bring the name of the next station to view. This is effected by the second post passed as the car leaves the station. Therefore the ratchet wheel O, remains in the position shown in Fig. 8, and the effect of the first post is simply to put the ratchet wheel in the position shown in Fig. 7, in which position it remains, while the car is at the station.

The operation is the same in either direction. In Fig. 10 we have shown a modification of the ratchet wheel, designed for street car use, and in this, as the indicator is operated by the driver, the second tooth o' is not required. The general construction of the wheel and the pawl mechanism is the same.

The mechanism whereby the driver operates the gear wheel corresponding to the wheel M, is shown in Fig. 3. In this, instead of the

quadrant, a double rack U′ is provided and it meshes with the gear wheel, M. The rack bar is connected by a cord or chain $y^{\times}$ to the lever V^{20}, the upper end of which is pivoted in the platform of the car, and has socketed connections with a removable foot lever extension v. A spring X^{10} is interposed in the cord $y^{\times}$ between the rack bar and a stud $W^{\times}$ in the top of the car. These being duplicated in the other end of the car, the rack bar is held normally in central position with four teeth (for example) on each side of the gear wheel. Pressure on the foot lever will give half revolution to the wheel, and move the band to disclose the name of a street. The foot lever may be shifted from one end to the other and the one may be plugged, or covered to prevent unauthorized operation of the indicator. The ratchet wheel for this modification, (shown in Fig. 10) has four teeth o, exactly as the four in Fig. 7. It has also pawls N^9, N^{10} of heavier inner ends and pivoted also upon the flange M′. The tails of the pawls also project at and are limited by stop pins n', n^2. When the driver operates the foot lever, the wheel is moved a half revolution, in the direction of the arrow, (Fig. 10) and the pawl N^{10} moves with its engaged tooth o^2, to the position of tooth o^3. The dog N^9 drops by gravity, the amount of movement permitted by pin n^2 and on its reverse movement will be inoperative. Movement in opposite direction of the car is the same.

We have also provided means for moving the band by pneumatic mechanism, in which the pneumatic tube has branches, as Z^2 leading to opposite ends of the car. In Fig. 6 we show the pinion $M^{\times}$, also attached to the upper spindle a, and operated by a rack $U^{\times}$, which in this case is driven by pneumatic pressure from cylinders $V^{\times}$, and $Y^{\times}$. The spindle of the rack $U^{\times}$, extends into the piston head $v^{\times}$. $y^{\times}$, is the piston of the cylinder $Y^{\times}$. The cylinders $V^{\times}$, and $Y^{\times}$, are connected by the pipe Z, as indicated. Z′, is a pipe leading from the pipe Z, which is connected in the same manner as the air brakes pipe to an air reservoir in the engine. The pipe Z′, is connected at its upper end to the end of the cylinder $Y^{\times}$. $X^{\times}$, is a spiral spring extending from behind the piston $y^{\times}$, to the end of the cylinder $Y^{\times}$; and $X^{\times}$, is a spiral spring which extends from behind the piston $v^{\times}$, to the other end of the cylinder $V^{\times}$. The cylinders $V^{\times}$, and $Y^{\times}$, may be suitably supported at the top of the car. The engineer may from the reservoir in the engine cause a pressure to be exerted against the piston $y^{\times}$, through the pipes Z′ Z^2. The end of the piston head $y^{\times}$, when forced against the seat will form a passage way for the air through the pipe $Z^{\times}$, into the cylinder $V^{\times}$, the pressure of the air being now exerted against the piston $v^{\times}$, and throwing it forward so as to cause the rack $U^{\times}$, to mesh with the pinion $M^{\times}$, and thereby rotate it half a revolution. The pressure of air exerted may of course be regulated as only a certain number of pounds of pressure will be required to operate the rack. In this case the ratchet wheel O, will be formed with only two teeth which are situated diametrically opposite to each other.

In order to provide a means when our indicator is worked pneumatically whereby the impetus of the spur pinion, $M^{\times}$, derived from the meshing of the rack $U^{\times}$, with it may be curtailed so that it may make only half a revolution at each forward movement of the rack $U^{\times}$, we make notches m^3, in the flange M′, diametrically opposite to each other and provide a spring catch m^4, to engage with the same. When the spur pinion is thrown around half a revolution by the forward movement of the rack, $U^{\times}$, the spring catch m^4, upon the notch m^3, getting opposite it drops into it and prevents any further movement of the spur pinion m. The form of ratchet wheel for this pneumatic mechanism is shown in Fig. 9. Here the ratchet wheels N^{11} and N^{13} are carried by each impulse a half revolution. They are the same as pawls N^9 and N^{10} and are limited by pins n^3 and n^4 in similar manner.

When used with the pneumatic mechanism it is necessary to reverse the indicator proper, in returning, and for this purpose it is provided with duplicate wheels on the spindle V and the handle g, as shown in the left of Fig. 5. Each of the collars 1, supports the ends of the spindles a, and b, and are designed to enable the spindles to be withdrawn through the side bar F, so that the rollers A, and B, and the roll may be entirely removed from the casing through the door 2, when it is desired to change the roll to another car and to place a new roll with its rollers into the indicator in the car from which this particular roll was taken, such new roll and car being intended for another route. The door 2, is hinged at 3, and provided with catches 4, so that the door can be readily opened and the roll and rollers taken out. It will be seen by this means we provide a very simple and effective method of changing the roll from one car to another for any different route in which it may be desired to place the car upon without interfering with the operating mechanism of the indicator.

Q, is a gong or bell secured on the end of the arm q, which is pivoted at q', at the bottom of the brackets R.

r, is a crank arm pivoted at r', on the arm q, and extending through the slot S, made in the bracket R.

s, is a notch cut in the lower side of the crank arm r, and designed to be held in engagement with the bottom end of the slot so as to support the bell in position.

t, is a pinion secured on the end of the spindle b, and engaging with the bell-hammer T, pivoted eccentrically at t' so that upon every half revolution or part revolution of the spindle b, the gear pinion t, will cause the said hammer to operate and ring the bell. Should

it be desired however, not to have the hammer operate upon the gong or bell Q, for instance in the case of a sleeping car where it would be decidedly objectionable—we simply have to push up the crank arm r, and allow the crank to go partially through the slot S, thereby letting the arm q, fall of its own gravity so as to bring the gong or bell Q, out of connection with the hammer T. There are doors provided in this case for the removal of the rollers after the spindles have been withdrawn.

What we claim is—

1. In a station indicator, a band mounted upon connected rollers, a gear wheel loose on the spindle on one of the rollers, and carrying pawls reversed to each other, and a ratchet wheel keyed upon the said spindle, having teeth reversed to each other, mechanism for rotating the gear wheel, and means for retracting the said mechanism to its normal position, all substantially as described.

2. In a station indicator, a band mounted upon connected rollers, a gear wheel loose on the spindle of one of the rollers and carrying pawls reversed to each other, and a ratchet wheel keyed upon the said spindle, having teeth reversed to each other, said teeth consisting of four sets arranged in relation to each other as described, and operated in connection with the pawls to give longer and shorter movement, mechanism for rotating the gear wheel, and means for retracting the said mechanism to its normal position, all substantially as described.

3. In a station indicator, having rollers with a band connecting them, said rollers being mounted upon connected spindles, a pinion upon one of said spindles and mechanism for operating the same in either direction a limited distance, a flange upon said wheels carrying pawls in reverse direction to each other, said pawls resting upon the periphery of the ratchet wheel, having four sets of teeth, o and o', means for limiting the movement of said pawls, and a dog on each side of said ratchet wheel pivoted upon a bar and arranged to permit movement of the said pawls in one direction but to trip them in the opposite direction, all substantially as described.

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