

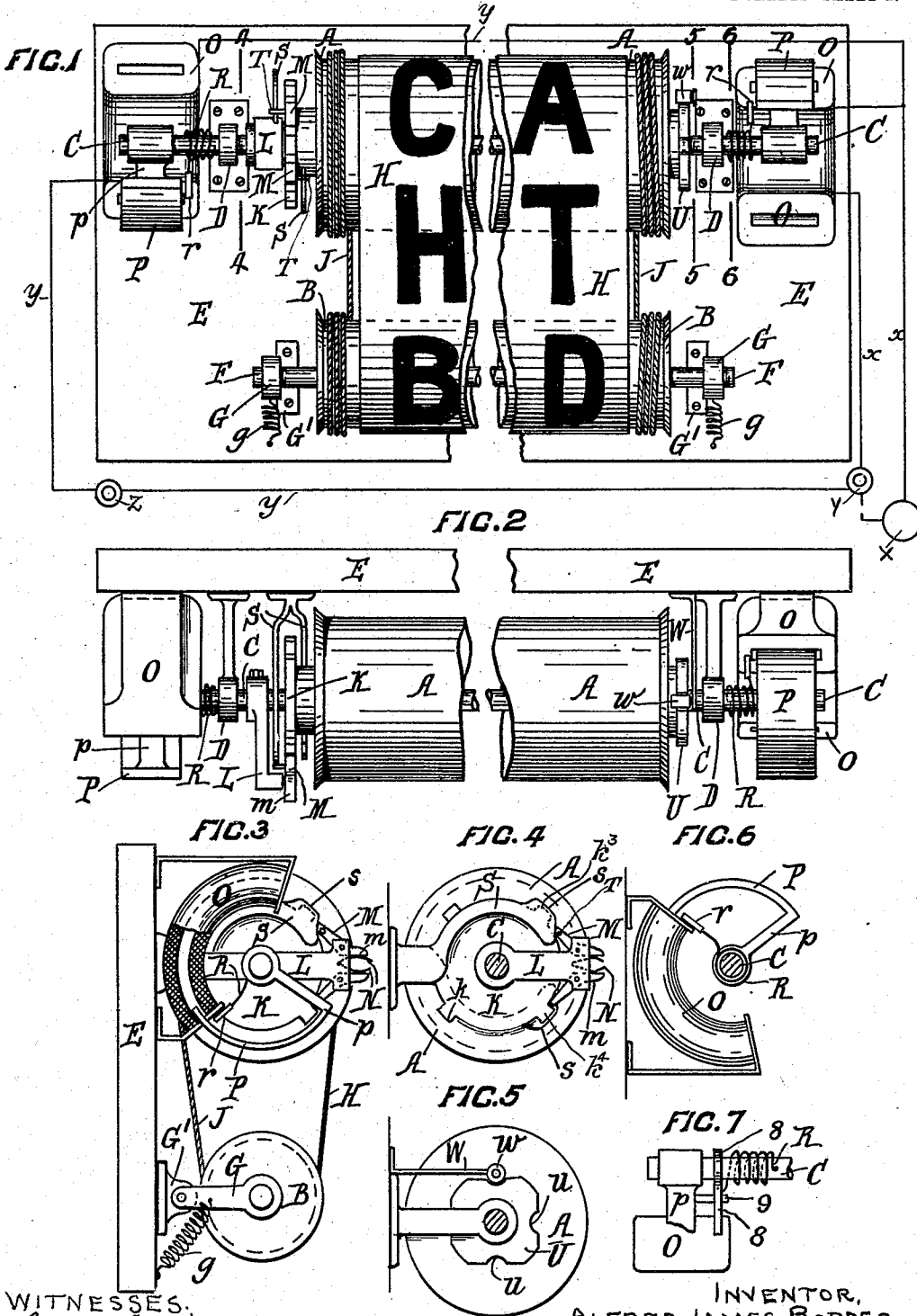
A. J. BORDER.
INDICATOR.

APPLICATION FILED MAY 10, 1906.

941,354.

Patented Nov. 30, 1909.

2 SHEETS—SHEET 1.



WITNESSES.
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2 SHEETS—SHEET 2.

FIG. 8.

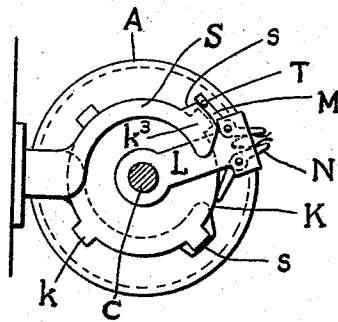


FIG. 9.

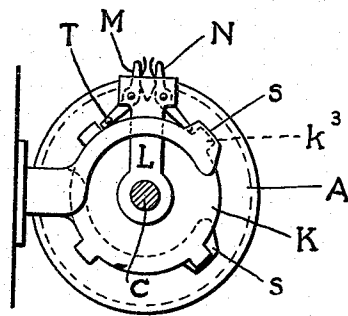


FIG. 10.

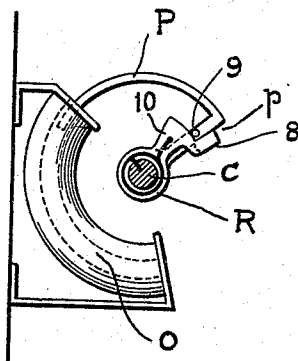
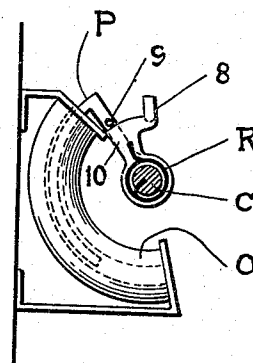


FIG. 11.



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INDICATOR.

941,354.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed May 10, 1906. Serial No. 316,080.

To all whom it may concern:

Be it known that I, ALFRED JAMES BORDER, subject of the King of Great Britain, residing at Wellington, New Zealand, have invented a new and useful Improved Indicator; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates specially to an indicator for displaying within a railway or tramway car, information as to the name of the next station or stopping place to be reached, while such car is traveling between two stations.

The invention may, however, be used for displaying other information in order, or intermittently, as desired, such for instance as for the displaying of advertisements, and the like.

The invention relates particularly to that class of indicator which embodies the use of a pair of drums arranged in parallel lines, and upon which is wound a canvas band or the like, bearing on it the names of the various stopping places in order, and which names are displayed as the band is wound from one drum to the other.

The present invention relates to means whereby the drums may be given the amount of revolution necessary to display a fresh name, and also to the manner in which the drums are mounted so as to allow of their regular action, and for perfect balancing.

In describing the invention, reference will be made to the accompanying sheet of drawings, in which:—

Figure 1 is a front elevation of the indicator with the containing box removed. Fig. 2 is a plan. Fig. 3 is an end elevation looking from the left of Fig. 1. Fig. 4 is a cross section on the line 4—4 of Fig. 1, and looking toward the right of that figure. Fig. 5 is a section on the line 5—5 of Fig. 1 looking toward the left, and Fig. 6 is a section on the line 6—6 of Fig. 1, looking toward the right. Fig. 7 is a detail view that will be hereinafter more fully referred to. Figs. 8 and 9 show the position of the pawls moving toward and in engagement with the next succeeding tooth of the display drum, in order to move said drum. Figs. 10 and 11 are side views, in advanced position and in retracted position, of the modification shown in Fig. 7.

A, B, are the drums which are mounted in

parallel lines one above the other, the upper one, A, being loosely mounted upon a spindle C carried by bearings D attached to a back plate E, while the lower one B is mounted on a spindle F carried in bearings G, one at each end of the drum, that are hinged to blocks G' attached to the back plate E. Springs (g) connect the bearings G with the back plate and tend to keep their outer ends normally drawn downward.

H, is a band of cloth or other suitable material that is wound around the drums A and B in such a manner that as the band is wound upon one drum, it will be unwound from the other. This band has upon its outer face, the information to be displayed, as for instance, the names of the stations or stopping places, arranged in the order in which it is to be displayed, so that as it is wound from one drum to the other, such information will be displayed.

A cord or cords J, are also wound upon the drums in a similar manner, one at each end, but wound in a reverse direction to that in which the band is wound. These cords will thus in conjunction with the band, serve to connect the two drums together in such a manner that they shall be revolved synchronously and be properly balanced against any loose independent movement. The downward pull of the springs (g) upon the lower drum B will serve to prevent any slackness in these cords or in the band H.

Attached to the drum A at one end thereof is the wheel K formed with teeth or sprockets (k) at regular intervals around its peripheral face. This wheel is connected to the drum A in such a manner that it shall rotate therewith.

Firmly secured to the spindle C is an arm L that extends outward, and to the outer end of which are pivoted the pair of pawls M which extend outward from each other on opposite sides of the arm L, and rest upon the periphery of the wheel K so as to engage with the teeth thereof when the arm L is moved in either direction by the rotation of the shaft C. Each of the pawls M is formed with an outwardly extending member (m) and a spring N bears against the two members so as to keep them apart and the pawls in close contact with the periphery of the wheel K. When arm L is moved, a pawl M, carried thereby, will engage with a tooth upon said wheel, and the motion will

be communicated to the drum A and, by means of the cords J, to the drum B so that the band H will be caused to unwind from one drum and be wound on the other. Thus, for instance, if the band H (Figs. 1 and 3) is to be moved downwardly, the right-hand solenoid is energized, and the core thereof starts to move into the coil, carrying the arm L upwardly (Fig. 8). This causes the pin T of the upper pawl M to slide over the outer edge of S lifting said pawl away from and over the tooth, k^3 , and the continued movement of the arm L (due to continuation of attraction of the core P) draws the lower pawl over said tooth k^3 , until, as shown in Fig. 9, the last-mentioned pawl lies behind that tooth. Upon breaking of the circuit, the arm L will be returned to the position shown in Fig. 3, the pawl last-mentioned will retain its engagement with tooth k^3 , and the drum will be moved. If the band H is to be moved upwardly, the left-hand solenoid is energized, the lower pawl is lifted, by the side plate, over and out of engagement with the tooth k^4 , and the upper pawl is brought into engagement with that tooth.

To provide for the necessary intermittent rotation of the drums A and B to display the information upon the band H, I arrange an electrical solenoid O upon the back plate E at each end of the drum A. These solenoids are each bent longitudinally into the form of an arc of a circle, as shown in Figs. 3 and 6. A metal core piece P bent into arc form approximating to the arc into which the solenoids are formed, is securely attached to each end of the spindle C by means of a suitable arm connection (p). These core pieces are adapted to enter the centers of the respective solenoids O, and to be drawn therein when the solenoids are energized. They extend outwardly on opposite sides of the spindle C so that as either one is drawn into its solenoid, it will impart a partial revolution to the spindle C in an opposite direction to that imparted to it when the core piece at the other end of the spindle, is drawn into its solenoid.

The movement imparted to the spindle C will be communicated to the arm L, so that it will be moved through a corresponding distance, and by the engagement of its pawls with the wheel K, such wheel and the drum A will be given the same rotatory movement. The band H will thus be caused to wind on to the drum A or to unwind therefrom, according to the direction in which the drum is rotated.

The length of core piece to be drawn into the solenoid and the consequent amount of movement to be imparted to the spindle and the drum will be regulated to any desired amount, and the names or information will be spaced upon the band H in such

a manner that each movement thereof will cause a fresh name to be displayed on the straight portion of the band extending from the one drum to the other. The wheel K will thus be provided with teeth spaced apart at intervals approximating to the amount of rotation to be given the drum in order to thus display a fresh name. In the drawings, the appliances are shown as constructed to impart a quarter of a revolution to the drum at each movement thereof, but it will be obvious that the appliances may be arranged so that less or greater movement may be imparted thereto.

In order to provide for the return movement of the spindle C after the solenoid has been deenergized, and thus to allow for a repetition of the movement thereof, a spring R is wound around each end of the spindle. Each of these springs has one of its ends fastened to the spindle, while its other end is loose and has a small bar or the like, (v) attached to it. Each one of these springs is so wound upon the spindle, that when the core piece at its end is drawn into the corresponding solenoid, the bar (v) will engage against the end of the solenoid and thus cause the spring to be placed in tension by the movement of the spindle, which tension will be sufficient, when the solenoid is deenergized, to cause the spindle to return to its normal position again.

Fig. 7 shows an alternative manner of mounting and actuating the springs R wound around the spindle. The end of a spring (at both ends the arrangements are alike, but oppositely disposed, and the springs are oppositely coiled) is, in this instance, secured to an arm 8 loosely mounted on the spindle C, while the opposite end of the spring is secured to the spindle. The arm (p) of the core piece P is provided with a laterally projecting pin or rod 9, which extends in the path of the arm 8 and clears the face of the solenoid. The spring is possessed of sufficient tension to keep the arm 8 in close contact with this pin, when the device is not in operation. As the spindle is rotated by the mechanism at its end, a part 10 of the arm 8 is first caused to engage with the face of the solenoid or other fixed point, so that the spring will be prevented from following, while the rotating spindle thus places said spring (see Fig. 11) in the greater tension necessary to return the spindle to its normal condition when released by deenergizing the solenoid coil. The pin 9 will thus, as it moves around with the arm (p) move away from contact with the arm (8) as soon as such arm is intercepted. When the spindle is released it will be turned back by the tension of the spring, causing the arm (p) to turn with it, and such pin (9) then again to come into contact with the arm (8), and immediately to

cause the solenoids to move by momentum to midway position, as well as to relieve the backward tension on that spring. The spring upon the other end of the spindle, which is similarly mounted, though wound in an opposite direction, will thereby be allowed to exert a contrary effect upon the spindle, and thus entirely prevent any excessive backward movement of the spindle, and insuring that the spindle actuating means will be properly governed, and that there will be no loose movements in the appliance.

As the arm L returns to its normal position, after being moved in either direction, the actuating pawl M will be lifted over the tooth upon the wheel K next in order to that with which it has engaged, in order to impart the requisite amount of revolution to the drum, so that it may drop behind such tooth and be in a position to engage with it when the appliance is again actuated. The means devised for carrying out this object, are clearly shown in Figs. 1, 2 and 4 of the drawings. These means consist of plates S of approximately semicircular shape, one of which is placed near each face of the wheel K, and curves in the opposite direction to that upon the other side of such wheel. The outer edges of these plates are substantially concentric with the axle of the wheel K throughout the greater portion of their length, but at the points opposite to the position assumed by the tooth to be next engaged after each movement of the wheel, at the end of such movement, the surfaces of the plates' edges are formed with outwardly projecting portions (s), the edges of which extend beyond the tooth top. Each pawl M is provided with a laterally projecting pin T which rests on the edge of the respective plates, and slides thereon as the arm carrying the pawl is moved, so that as such pin on the return movement of the arms reaches the projection (s), the pin will be caused to rise and lift the the pawl clear of engagement with the tooth, and after the pawl passes the tooth will be allowed to drop back so that it shall lie in a position to engage therewith, when the arm is again moved. As an instance of operation of the parts just described, let it be assumed that the drum as shown in Fig. 4 is to be moved in a clock-wise direction. The solenoid shown in Fig. 6 will be energized and the spindle C and arm L will be rocked upwardly; that pin T which is shown in Fig. 4 will be lifted (during such upward rocking) by the inclined face of the projection s of the upper plate S, and will be lifted thereby over the tooth, of wheel K, behind said plate, and the lower pawl will click over said tooth. Upon the breaking of the circuit, the spindle will be returned to its original position, and the lower pawl, now in engagement with the

tooth aforesaid, will cause the drum to move in a clock-wise direction, while the upper pawl will click over the edge of the projection of the upper plate S. When the drum is to be operated in an anti-clockwise direction, the solenoid of Fig. 3 is energized, the arm L is rocked downwardly, and the pawls operate in a reverse direction to that previously described, to pass over the tooth covered by the projection of the lower plate S and to then engage that tooth.

To the end of the drum A, remote from the wheel K, a disk U (Fig. 5) is fixed. This disk is formed with notches (u) in its edge, at intervals apart, approximating to the spaces between the teeth on the wheel K. A spring arm W projects outward from the back plate E and is provided, on its outer extremity, with a small roller (w) that is adapted to enter the notches (u) in the disk U. This roller is kept in contact with the edge of such disk, and will revolve upon it as the drum is rotated, and will spring into the notches (u) as such reach it, and thus serve to retain the drum from any back movement as it is intermittently rotated in the manner described.

The whole appliance will be inclosed in a suitable casing (not shown in the drawings) provided with a glass covered aperture through which the name displayed upon the traveling band may be viewed.

It will be evident that the names arranged on the band may be displayed in order by causing the drums to rotate in the one direction, and in a reverse order by causing them to rotate in the reverse direction. Thus the names of the several stopping places of a train upon a forward journey, may be indicated as the journey proceeds, by intermittently energizing one of the actuating solenoids, and upon the return journey, the same names may be displayed in the reverse order by intermittently energizing the other solenoid.

The control of the solenoids may be effected in any desired manner. As shown in Fig. 1, the right hand coil O may be included in the circuit of wires x, and push button or switch Y. The left hand coil may be included in the circuit of wires y and push button or switch Z. The parts Z and Y and the source of current X are carried by the car which bears the indicator or on any other part of the train.

What I do claim as my invention, and desire to secure by Letters Patent, is:—

1. In indicators of the class herein described comprising a drum to be intermittently rotated in either direction, a spindle upon which the drum is loosely mounted, a pair of electrical solenoids of arc form and provided with means for electrically energizing either of them at will, a pair of metal core pieces secured to the spindle and adapt-

ed to enter the respective solenoids and to be drawn therein when such are energized, and means whereby the rotatory movement given the spindle, may be communicated to the drum, substantially as specified.

2. In indicators of the class herein described comprising a drum to be intermittently rotated in either direction, a spindle upon which the drum is loosely mounted, an arm secured to the spindle, a pair of pawls upon the outer end of such arm extending in opposite directions to each other, a toothed wheel at one end of the drum, and with the periphery of which the pawls engage, a pair of metal core pieces of arc form secured to the spindle and extending outward therefrom in opposite directions, a pair of electrical solenoids of correspondingly arc form into which the respective core pieces enter and are adapted to be drawn and means whereby the solenoids may be separately energized as required, substantially as specified.

3. In indicators of the class herein described, comprising a drum to be intermittently rotated in either direction, a spindle upon which the drum is loosely mounted, a pair of electrical solenoids of arc form and provided with means for electrically energizing either of them at will, a pair of metal core pieces secured to the spindle and adapted to enter the respective solenoids and to be drawn therein when such are energized, springs adapted to be placed in tension when the spindle is rotated in either direction so as to return it to its normal position when released, and means whereby the rotatory movement given the spindle, may be imparted to the drum mounted upon it, substantially as herein specified.

4. In indicators of the class herein described comprising a drum to be intermit-

tently rotated in either direction, a toothed wheel at one end of the drum, a spindle passing loosely through the drum, an arm secured to the spindle, a pair of pawls pivoted upon the outer end of such arm extending in opposite directions from each other, and kept normally in engagement with the peripheral face of the toothed wheel, a pair of plates of semi-circular form arranged one on each side of the toothed wheel and curving in opposite directions to each other, and the outside edges of which plates are arranged to lie in the same plane as the periphery of the toothed wheel, a projection upon the edge of each plate projecting beyond the plane of the teeth on such wheel, a pin projecting laterally from each pawl and resting upon the edge of the respective plate, and means whereby the arm carrying the pawls may be given a partial rotatory movement in either direction, substantially as specified.

5. In indicators of the class herein described, a spindle, a drum loosely mounted thereon, means to partially rotate said spindle and intermittently revolve the drum, a pair of arms loosely mounted upon the spindle, a pair of springs wound upon the spindle in opposite directions to each other and each having one end secured to the spindle, and its other end secured to one of said arms and bars connected with the spindle and adapted to engage with said arms upon movement of the spindle in one direction only, substantially as herein specified.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

ALFRED JAMES BORDER.

Witnesses:

WILMOT BOCLASE,

WALTER ALEXANDER.