(No Model.) 2 Sheets—Sheet 1.

W. T. SNEDDEN.

STREET OR STATION INDICATOR.

No. 456,006. Patented July 14, 1891.

Fig. 1.

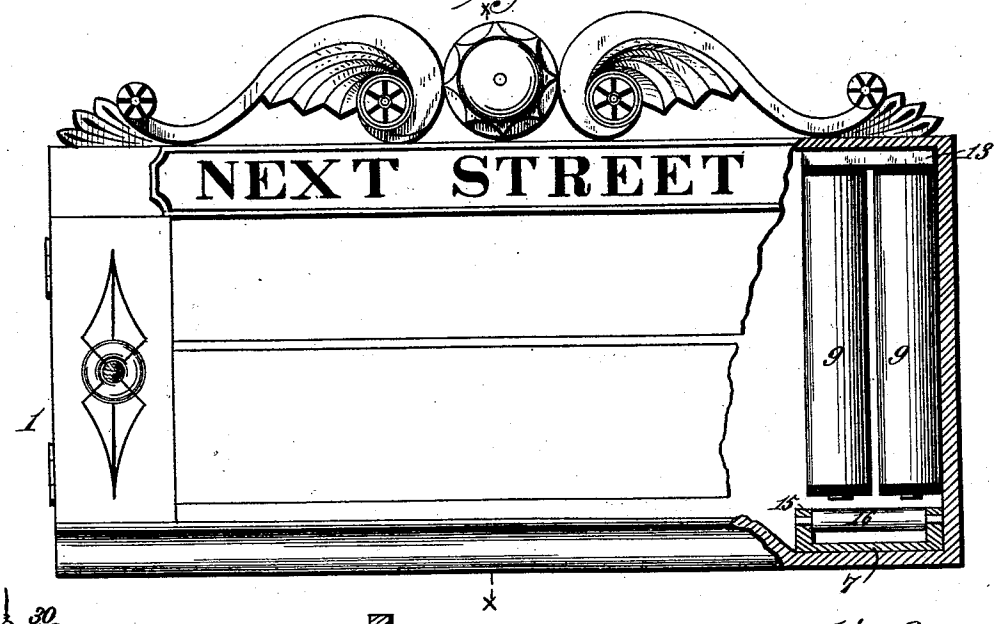


Fig. 2.

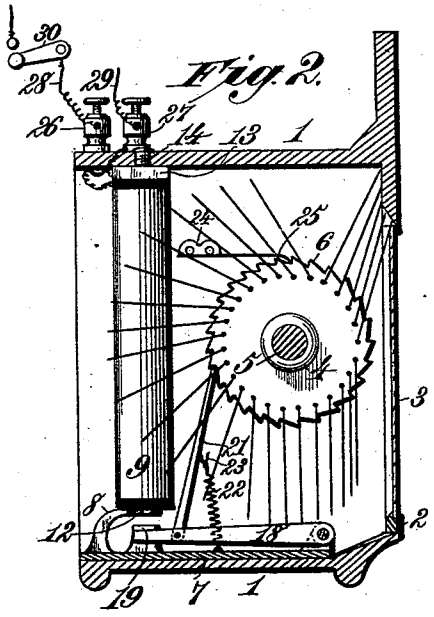
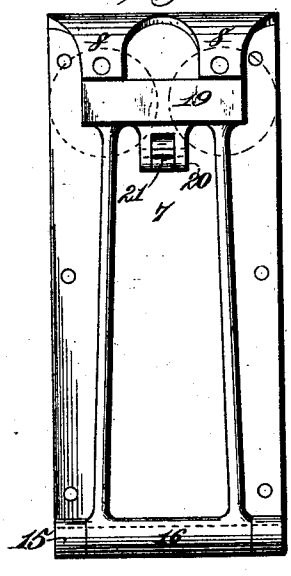


Fig. 3.



Witnesses.
Robt Ewett.
J. A. Rutherford

Inventor:
William T. Snedden.
By James L. Norris.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. T. SNEDDEN.

STREET OR STATION INDICATOR.

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Fig. 4.

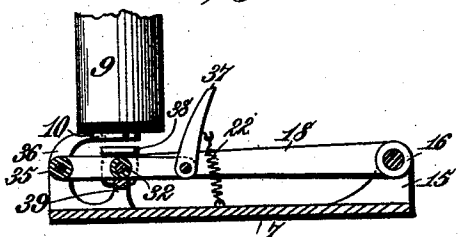


Fig. 5.

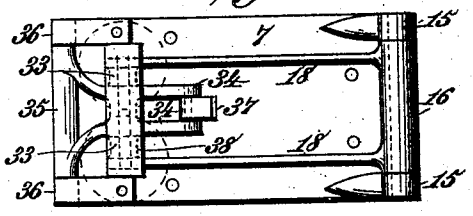


Fig. 6.

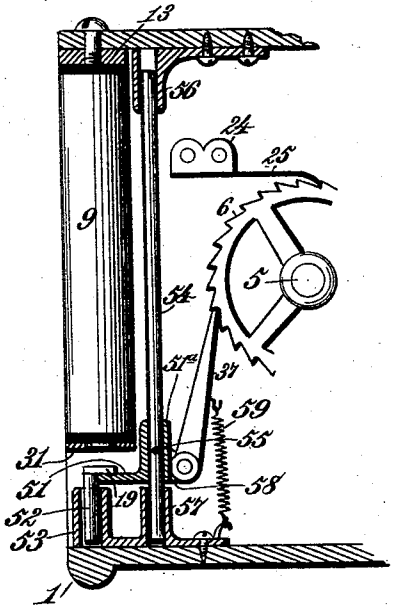


Fig. 7.

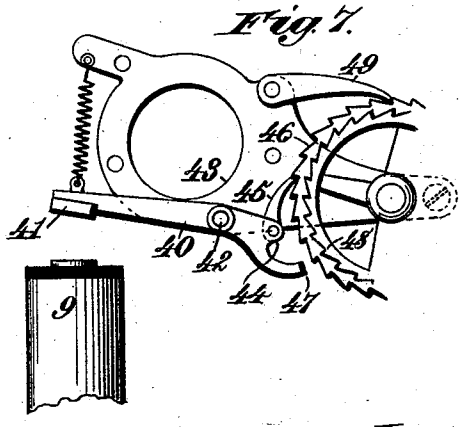
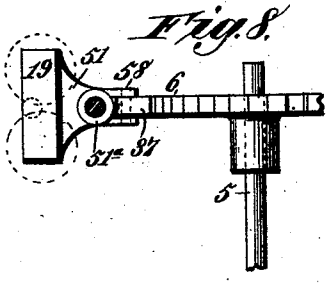


Fig. 8.



Witnesses.
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J. A. Rutherford.

Inventor:
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By James L. Norris.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM T. SNEDDEN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ELECTRIC STREET AND STATION INDICATOR COMPANY, OF SAME PLACE.

STREET OR STATION INDICATOR.

SPECIFICATION forming part of Letters Patent No. 456,006, dated July 14, 1891.

Application filed January 14, 1891. Serial No. 377,733. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. SNEDDEN, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Street or Station Indicators, of which the following is a specification.

My invention relates to certain improvements in street or station indicators, the purpose thereof being to provide a simple and reliable movement whereby the card-cylinder may be operated without employing intermediate gears now used upon many indicators of this kind.

It is my purpose, also, to combine with the card-cylinder means whereby an exactly-equal and unvarying movement may be given at all times to the said cylinder and to the devices rotating the same, and whereby, also, said cylinder may be revolved sufficiently to drop a card by one or by more than one operation of the device by which revolution is produced, positive means being employed to arrest the rotary movement of the cylinder at such a point that a single card only can be dropped upon each operative movement of the roll.

It is my purpose, also, to simplify and improve the construction and operation of mechanism of this class; and to the several ends specified the invention consists in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then specifically pointed out in the claims following this specification.

Referring to the accompanying drawings, Figure 1 is a front elevation of a station or street indicator, a portion of the front being broken away to show the interior. Fig. 2 is a transverse section of Fig. 1 upon the line *x x*. Fig. 3 is a plan view of the magnet and pawl supporting plate. Fig. 4 is a detail side elevation showing a construction of the actuating-lever by which the pawl is operated by a less throw of the latter. Fig. 5 is a plan view of the parts shown in Fig. 4. Fig. 6 is a detail section, partly in elevation, showing a further modification. Fig. 7 is a view showing part of the ratchet of the card-cylinder with positive means for advancing the same and arresting said advance at a given point. Fig. 8 is a plan view of the parts shown in Fig. 6.

In the said drawings, the reference-numeral 1 designates the indicator-casing, which is of the form usually employed in this class of devices, being provided with a hinged panel 2 in front, having a transparent pane 3, through which the names of the streets or stations are displayed as the cards drop. Within the casing is the card-cylinder 4, mounted upon a shaft 5, the journals of which have bearing in suitable boxes at or near the ends of the casing, a ratchet 6 being mounted rigidly on said shaft between the end of the cylinder and the box.

At the end of the indicator-casing and beneath the ratchet 6 is arranged a plate of any suitable material, extending transversely from the rear toward the front of the casing. At the rearward end of said plate is formed a duplex bracket consisting of plates 8, rising above the plate 7 and curved into horizontal position, the horizontal portions being separated from each other and extended a short distance toward the front. Upon the forward ends of these bracket-plates, which possess a suitable degree of elasticity to prevent severe jarring, I mount electro-magnets 9, secured by screws 10, which engage with the insulating ends or rubber heads of the magnets at points near their edges, so that the cores 12 project downward in front of the bracket-plates 8. The magnets are wound upon long cores in order to obtain the necessary power without using an excessively-strong battery-current, and they are connected at their upper ends by a soft-iron bar 13, which is fastened to the upper wall of the casing by a pin 14, fitting loosely in an aperture in said bar to hold the magnets in place and permit some vertical play.

Upon the forward end of the plate 7 are formed lugs 15, having openings adapted to receive a pivot-bolt or pintle, and between said lugs is interposed a sleeve 16, in which the said pintle 17 lies. Upon said sleeve are

formed or mounted levers 18, which extend rearward to points beneath the electro-magnets, and upon the ends of said levers an armature 19 is mounted, arranged directly beneath the cores of the electro-magnets.

Upon the armature 19 is mounted or formed a central bracket 20, having lugs, between which is pivotally mounted the end of a pawl 21. This pawl extends upward with a slight inclination toward the front until its end or point engages with the teeth of the ratchet 6, as shown in Fig. 2, being held in such engagement by a coiled spring 22 of moderate tension, one end of the same being attached to a hook 23 on the pawl and the other end to the plate 7. Upon the end wall of the casing 1 is mounted a bracket 24, supporting a spring-pawl 25, which rests upon and snaps behind the teeth of the ratchet as it advances to prevent retrograde movement. The electro-magnets are wound in the usual manner, one terminal entering the first coil from a binding-post 26 and the other terminal emerging from the second coil to a binding-post 27. From these binding-posts wires 28 and 29 are carried to the opposite poles of any suitable form of battery, either primary or secondary, any preferred form of either being used. In one of the wires referred to is interposed a circuit breaker and closer 30, which may be a switch-lever, push-button, or other form of circuit making and breaking device, placed where the person operating the indicator shall have convenient access thereto. The same result may be produced, also, by obstruction-bars arranged at suitable points upon the roadway to act upon a swinging lever or other bar beneath the car, these devices being of any suitable and well-known construction and requiring no special description.

No particular form is required for the circuit-closing device, its main requisite being that it shall remain normally open. This may be accomplished by the use of a spring or by other familiar means.

The levers 18 are usually constructed of some metal which is not diamagnetic; but they may, if preferred, be formed of any metal, conducting or non-conducting, and the armature, which is made of soft iron, may be insulated from said levers; or the armature-plate and levers may be made integral, the bracket-plates 8 being properly insulated from the cores of the electro-magnets 9.

In practice I attach to the rubber end or head of each electro-magnet a ring or washer 31, projecting somewhat below the ends of the cores 12, whereby the armature-plate is prevented from making contact with the cores, the object being to avoid the excess of residual magnetism in the armature and prevent the noise produced by the striking of the armature upon the cores.

The attraction of the electro-magnets, as is well known, varies very greatly with the interval separating the cores from the armature-plate, and to secure the maximum advantage, together with the necessary throw of the pawl operating the ratchet, and to cause the armature to remain as nearly as possible in parallelism with the end of the core of the magnet, I prefer to use a compound lever, especially in cases where the card-cylinder contains a large number of cards, which, by their leverage, cause a backward drag upon the cylinder, or, in other words, render the rear side of the cylinder heavier than the front side. The lever referred to is shown in Figs. 4 and 5, in which the construction is similar to that shown in Figs. 1, 2, and 3, save that the levers 18 are provided at their rearward or rising and falling ends with eyes which receive the ends of a pivot-pin 32, rigidly connected with the ends of said levers 18. Upon this pin, between the ends of the levers 18, are mounted sleeves or hubs 33, which are formed between the ends of a second pair of levers 34 of the third order, having a fulcrum 35 at the rear end of the plate 7 and supported upon side brackets 36, sustaining the electro-magnets. Between the forward ends of the second pair of levers is pivoted the end of a pawl 37, by which the ratchet is operated. The armature-plate 38 is provided at its ends with downwardly-turned lugs, in which the extremities of the pivot-pin 32 are rigidly fastened. This construction enables me to mount the armature upon the ends of the longer levers, and thus preserve it in or very nearly in parallelism with the ends of the cores of the magnet, which would not be possible if the armature were mounted on the ends of the levers 34. At the same time, the pawl being carried by the short levers 34, its throw is increased as compared with that of a pawl pivoted upon the levers 18. I secure, therefore, this increased throw and at the same time retain the armature in a position parallel, or nearly so, to the ends of the cores 12, which would not be possible if it were mounted on the short levers 34. As the card-cylinder is not in equilibrium, inasmuch as the cards upon the rear of the cylinder are so held as to exert a leverage, as shown in Fig. 2, it is not likely that the throw of the pawl operated by the armature-levers will be carried beyond the point where the cylinder should stop in order that a single card only may be dropped. To make this result sure, however, as the cylinder may in some cases have but few cards and the want of equilibrium be less noticeable, I have provided the automatic stop device shown in Fig. 7. This device consists of a single or double lever 40, having an armature-plate 41, which is attracted by the electro-magnets 9, which may be inverted and arranged beneath the armature, although this is not essential to the construction proposed. The single or double lever 40 is fulcrumed upon a pivot-pin 42, which is supported by a frame 43, screwed to the end wall of the indicator-casing and providing a bearing for one end of the cylinder-shaft. Beyond the

fulcrum 42, or between the same and the ratchet of the card-cylinder, the lever is provided with one or more lugs 44, upon or between which is pivoted one end of the push-pawl 45. This pawl meshes with a series of ratchet-teeth 46, so formed that the upward movement of the pawl will cause the ratchet to advance or rotate a fractional part of a revolution at each stroke of the lever 40. The end of the lever 40 is extended beyond the lug or lugs 44 and may be curved for this purpose, as shown in Fig. 8, its point 47 lying in a different vertical plane from that in which the pawl operates. Said point is extended far enough so that when the stroke of the pawl 45 is substantially completed, or very nearly so, said point will engage a second and separate series of teeth 48, formed upon the ratchet, but cut in the opposite direction from the first series of teeth 46. It will be seen that, no matter how quickly the stroke of the pawl may be made, the point of the lever 40 will invariably engage the second series of teeth 48 and arrest the rotary movement at the instant the operative stroke of the pawl 49 is completed. A check-pawl 49 is used, as in the other forms, to hold the ratchet, and a spring 50 is employed to restore the pawl 45 to place when released by the magnets.

I make the pawl-carrying lever 40 of the first order—that is, with its fulcrum between the armature and the ratchets—for the following reason: As the lever acts the curved end 47 in approaching the series of teeth 48 has a movement, although a slight one, with the movement of said teeth. It will be seen that by varying the curvature of the end 47 this may be increased or decreased, the purpose being to give a slightly-yielding stop which shall arrest the ratchet without the abrupt shock caused by other stop devices which move directly toward the engaging teeth without any yielding movement.

I have illustrated in the drawings a modified form of actuating mechanism which may be used, if preferred. It consists, simply, of an armature-plate, Fig. 6, mounted on a central bracket 51, having a leg 52, which slides in a vertical socket 53, and provided with a sleeve 51^a, adapted to move with a vertical stem 54, to which it is fastened by a cross-pin 55, said stem being guided at its ends by an upper and lower socket 56 and 57, respectively. The push-pawl is pivoted between lugs 58 on the sleeve 51^a and held in engagement with the ratchet by a spring 59, which also aids the descent of the bracket 51.

By this invention the actuating mechanism is materially simplified, the number of parts reduced, and the operation of the card-cylinder rendered exact. I am also able to operate the card-cylinder by a short lift of the pawl-carrying lever without materially disturbing the parallel position of the armature with relation to the ends of the cores of the magnet, and thus obtain a strong action of the latter with a moderately-strong battery-current, Finally, I provide an exceedingly simple but positive and perfectly accurate stop device by which the cylinder is arrested at the instant its movement is completed, thus preventing the fall of more than a single card.

What I claim as my invention is—

1. In a street or station indicator, the combination, with a card-cylinder having a ratchet mounted on its shaft, of a lever of the third order having a pawl pivoted on its end, a longer lever pivoted at one end and having its other end pivotally connected with the pawl-carrying lever at a point between the fulcrum of said lever and the pawl, an armature rigidly mounted on the pivotal connection of the two levers, and electro-magnets arranged to attract said armature, substantially as described.

2. In a street or station indicator, the combination, with a card-cylinder having a ratchet on its shaft, of an electro-magnet supported upon an elastic bracket, a lever of the third order composed of two united arms fulcrumed on the said bracket and having a pawl pivoted on the rising and falling ends thereof, a longer lever composed of two rigidly-united arms pivoted at one end to a support and having the other ends pivotally connected to the pawl-carrying lever between its fulcrum and pawl, and an armature rigidly connected to the rising and falling ends of the longer lever, substantially as described.

3. In a street or station indicator, the combination, with a card-cylinder having on its shaft ratchets provided with separate series of teeth cut in opposite directions, of an armature-carrying lever of the first order having a pawl engaging one series of teeth on the ratchet and provided with an integral curved end projecting toward and lying in the plane of the second series of ratchet-teeth, and an electro-magnet to attract the armature, substantially as described.

4. In a street or station indicator, the combination, with one or more electro-magnets, of one or more levers of the third order having pivotally mounted upon their ends a pawl, a card-cylinder having a ratchet engaged by said pawl, one or more levers having an armature upon their rising and falling ends and connected at said ends to the levers of the third order, a circuit for the magnets, and a circuit making and breaking device, substantially as described.

5. In a street or station indicator, the combination, with a card-cylinder having a ratchet provided with a double series of teeth cut in opposite directions, of an armature-lever of the first order having a pawl pivoted thereon and engaging one series of teeth on the ratchet, the end of said lever being prolonged beyond the point of attachment of said pawl and curved toward the ratchet and slightly toward the fulcrum of the lever, its point being

adapted to engage the second series of teeth on the ratchet as the lever reaches the end of its stroke, substantially as described.

6. In a street or station indicator, the combination, with a card-cylinder having a ratchet provided with two oppositely-cut series of teeth, of an armature-lever having its fulcrum between the armature and the ratchets and having a pawl pivotally mounted thereon between said fulcrum and the point of the lever, the pawl engaging one series of said teeth, the point of the lever being curved toward the ratchet and toward the fulcrum of the lever and adapted to engage the other series as the stroke of the lever is completed, or nearly so, to arrest the same with a yielding stop and without shock, and an electromagnet attracting the armature on said lever, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WM. T. SNEDDEN.

Witnesses:
JAMES L. KING,
W. N. KEMPSTON.