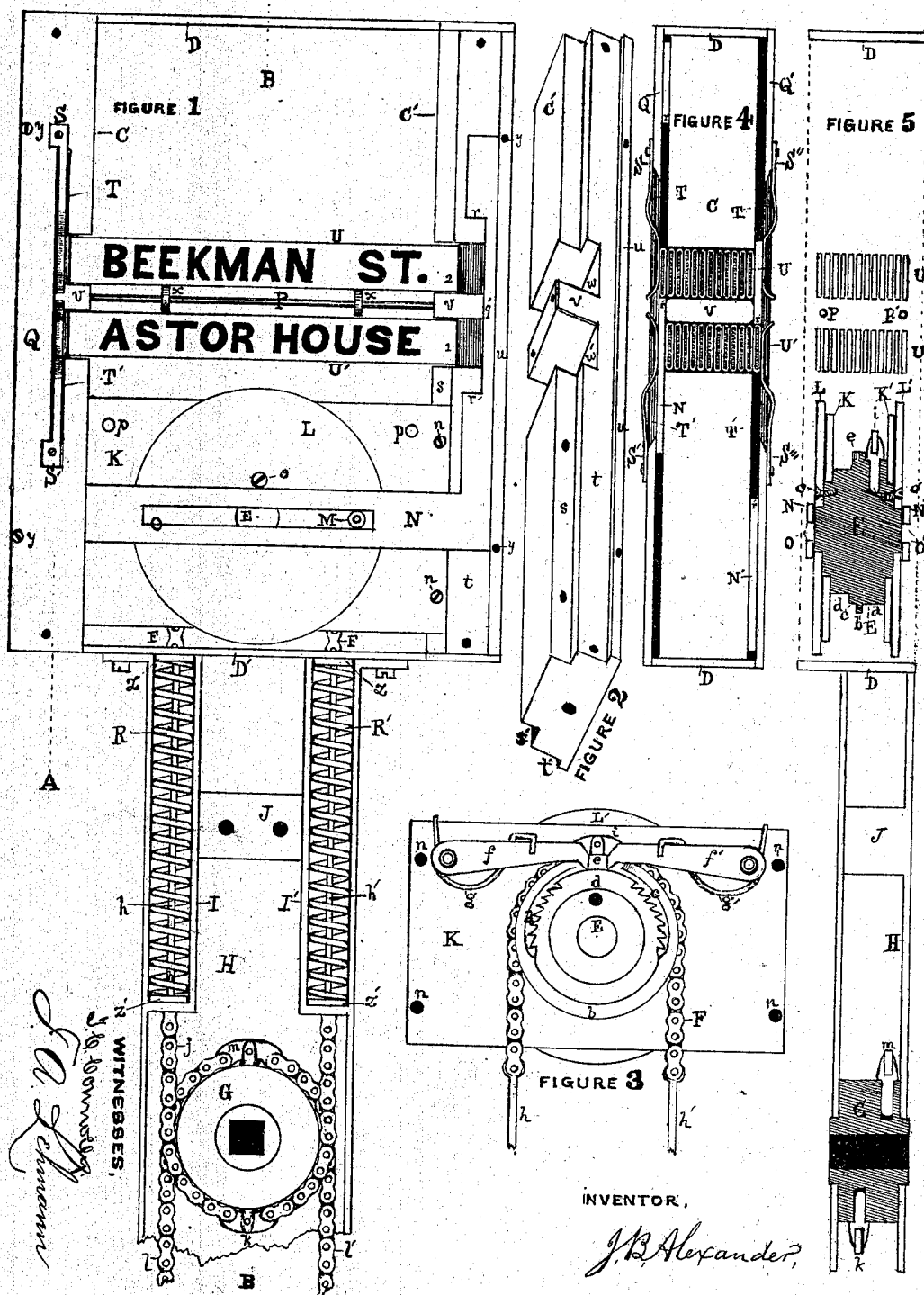


J. B. Alexander,
Station Indicator.
No. 112671.

2 Sheets, Sheet 1.

Patented Mar. 14, 1871.



J. B. Alexander,

Station Indicator.

No. 112,671.

Patented Mar. 14, 1871.

2 Sheets, Sheet 2.

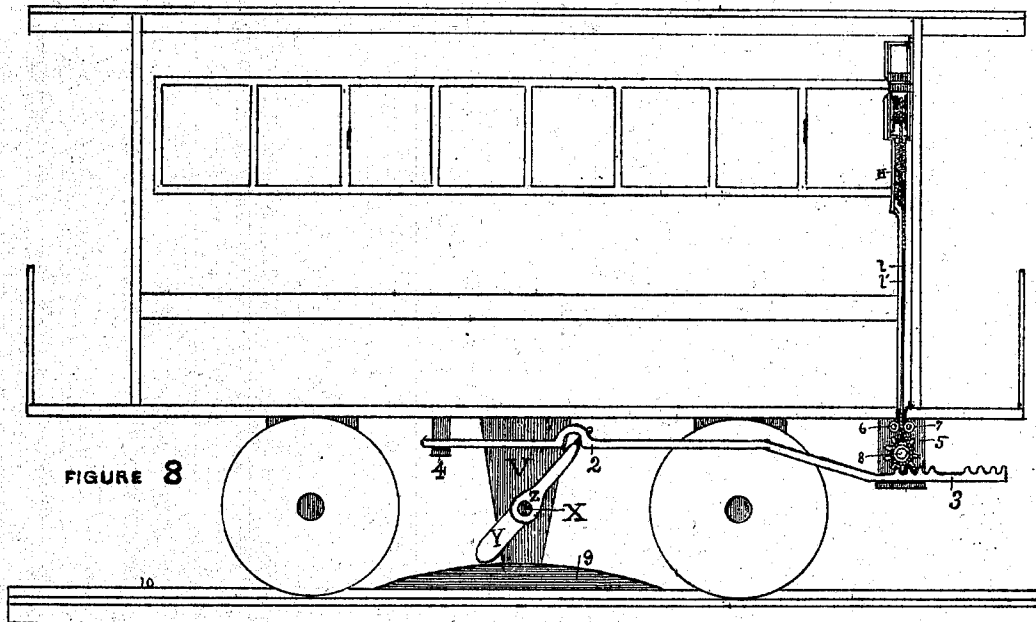


FIGURE 8

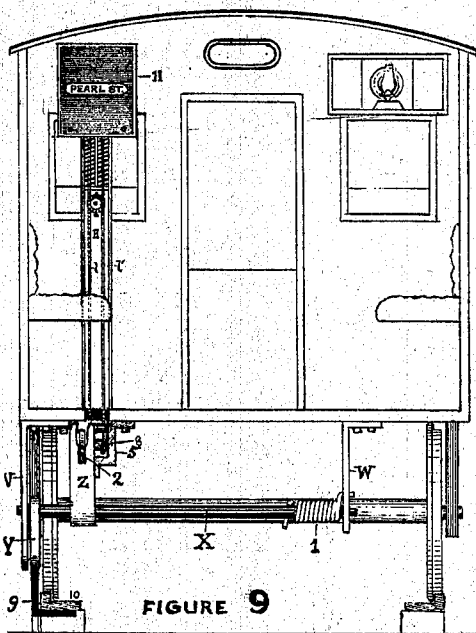


FIGURE 9

EAST 64th ST.

FIGURE 7

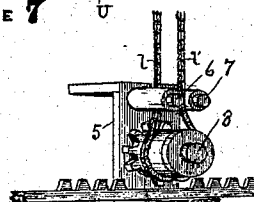


FIGURE 10

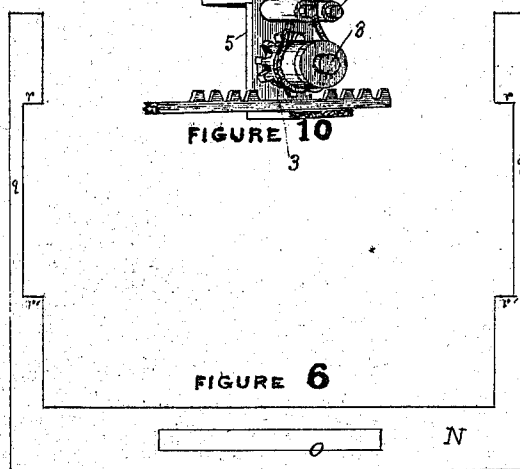


FIGURE 6

WITNESSES.

J. A. Conner
J. A. Lehmann

INVENTOR.

J. B. Alexander

UNITED STATES PATENT OFFICE.

JOSEPH BELL ALEXANDER, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN RAILROAD-STATION INDICATORS.

Specification forming part of Letters Patent No. **112,671**, dated March 14, 1871.

To all whom it may concern:

Be it known that I, JOSEPH BELL ALEXANDER, of Washington, in the District of Columbia, have invented a new Method of Indicating the Streets or Stations in Succession as Approached by Railway-Cars, and for general purposes where such indication is required; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification, and represents, in—

Figure 1, a front elevation of the indicator, the face-plate and one of the gibs being removed, so as to show the internal arrangement of parts; Fig. 2, an outline, in perspective, showing the form of the side pieces of the indicator; Fig. 3, an elevation of the main pulley, with its cams, ratchets, and accompanying pawls, the front supporting-plate and front crank-wheel being removed; Fig. 4, a vertical section of the indicator at dotted line A, showing the arrangement of the cards, grooves, gibs, springs, and sliders at the moment when a card has been pushed up at the front and another card pushed down at the back of the machine; Fig. 5, a vertical section of the indicator at dotted line B; Fig. 6, an outline, showing the form of the sliders; Fig. 7, a detached card, in perspective; Fig. 8, a longitudinal vertical section of a street-railway car, showing the indicator as attached internally at one end of the car, and connected, by means of wires or chains, with apparatus attached to the bottom of the car, beneath the floor, for the purpose of automatic movement; Fig. 9, a transverse vertical section of the preceding figure; and in Fig. 10, an elevation, in perspective, showing the support of the lower pulley and rack, one half of the support being removed to display the arrangement.

The nature of my invention consists in indicating to passengers within a railway-car the streets, stations, public buildings, and places of note as each is successively approached, by means of two galleries of printed cards arranged in a machine, which will, when operated by hand or automatically, slide a card

from one gallery upon the other, so as to present the name of the street or place to be indicated at an aperture in the face-plate of the machine, and which action may be continued indefinitely, either directly or reversely, as required, by means of the mechanical devices and arrangements for the said purpose, as herein described.

Similar letters or figures of reference denote like parts wherever they occur in the accompanying drawing.

I should prefer to make the frame of the indicator, in the device represented, of cast-iron, in parts suitably planed up and fitted so as to go together squarely and form the frame, as represented by C, D, C', and D' in Fig. 1.

The top piece, D, and the bottom piece, D', are thin flat castings, planed on the edges so as to agree in width with the side pieces, C and C', when the gibs Q and Q' are screwed upon them, D and D' being cut away at the ends to allow the ends of Q and Q' to lie flush in them.

C and C', as seen in Fig. 2, are squared up into proper width, thickness, and length.

The rabbets *t* and *t'* are made to correspond in depth with the thickness of the brass mountings of the ends of the cards U and U'. (See Fig. 7.) Also, the rabbets *s* and *s'* are made deep enough to support the ends of the supporting-plates K and K', so that the crank-wheels L and L', lying outside of and upon the plates K and K', shall allow the sliders N and N', resting on the rabbets *t* and *t'*, to slide up or down freely over them.

The transverse grooves *w* and *w'* are cut out smoothly, of sufficient width to admit of the free passage of the brass-mounted ends of the cards U through them.

On the inner face of the partition *v*, very near the front and back edges, two small holes are drilled, as journals for the ends of the wire axles P and P', upon which axles small brass pulleys *x* and *x'* are made fast at about one-fourth the length from each end of the axles. These axles should be of spring-steel wire, and made to turn freely.

The main pulley E (see Figs. 1, 3, and 5) is divided at or about the center by the raised partition *b*. The part *a* receives the chain F, fastened strongly and centrally into the top

of the pulley by the pin *i*. The pulley is journaled into two strong plates of wrought-iron, K and K', between which and near their ends the pawls *f* and *f'* are attached loosely to axles, around which the spiral springs *g* and *g'* wind and bear upon the pawls, so as to press them downward and inward. On the front portion of the main pulley the narrow surface of the space is divided into a ring, *c*, which is broken at the top by the projecting cam *e*, and turned suddenly inward on both sides at a point on a horizontal line a little below the center of the pulley. In front of *c* the circle *d* is of a less diameter, and notched into ratchet-teeth about one-quarter of the circumference each way, the object of this arrangement being to prevent the return of the pulley to equilibrium, when once moved either to right or left, until the complete stroke is made.

When in operation, if the pulley E should be turned to the right, the pawl *f* would catch in the teeth of the ring *d* until the last tooth was reached, when the beak of the pawl, finding the side of *c* no longer in the way, jumps off from the ratchet *d*, and, mounting the ring *c*, allows the pulley to return to equilibrium, when the cam *e* throws off the beak of the pawl, and it falls down upon the top of *d* again. If the pulley be turned to the left, the same movement takes place with the pawl *f'*.

This arrangement effectually prevents any derangement of the cards U and U' by the catching of other cards by the sliders N and N' before the first-engaged cards are pushed entirely home.

K and K' are strong wrought-iron plates, (See Figs. 1, 3, and 5,) which form journals for the support of the main pulley E, and are attached at the ends to the rabbets *s* and *s'* of the side pieces, C and C', by the screws *n* and *n'*. L and L' are wheels, formed of wrought-iron plate, and are attached firmly by screws *o* and *o'* to the ends of the axle of the cast-iron main pulley E. They have a small steel pulley, M, which turns upon a steel pin fixed solidly into the wheel at a proper distance from the center, and act as cranks to impel the sliders N and N' up or down. N and N' (see Figs. 6, 5, 4, and 1) are sliders, of steel or wrought-iron plate, formed in shape as in Fig. 6, and of the same thickness as the brass mounting on the ends of the cards U and U', and slide up or down in the rabbets *t* and *t'*.

The long notches forming the narrow parts *q* *q'* must exactly agree in width with the narrow parts of the rabbets *t* and *t'* of the side pieces, C and C', at the transverse grooves *w* and *w'*.

The points marked *r* and *r'* of the sliders are squarely cut on the end, and, when moved, impinge upon the metal-mounted ends of the cards U or U', and force them up or down from one gallery to the other.

In the upward movement the parts *r'* must fully reach the line of the upper surface of the partition *v*, and in the downward movement

the parts *r* must fully reach the line of the lower surface of the partition *v*, and thereby secure the complete transmission of a card from one gallery to the other.

The slots O and O' of the sliders must receive, and allow to work freely in them, the pulleys M.

Q and Q' are gibs, of smooth metal plate, which hold the sliders N and N' in place, allowing them to move freely, and are attached to the planes *u* of the side pieces, C and C', by the screws *y* and *y'*.

The narrow parts of the gibs Q and Q' must extend in width sufficiently to cover about one-half of the metal mountings of the cards U and U', the other half being impinged upon by the springs S and S', riveted on the gibs and pressing downward through the slots T and T'. These springs are bent in the manner represented in Fig. 4, and each one must have power to push back the entire column of cards in the gallery it impinges upon when the resistance of its antagonist is for a moment removed.

The main body of the indicator so far described may have a face-plate, with an aperture admitting the appearance of one card only, (as seen in Fig. 9,) screwed onto the front, when the machine is intended to be attached to the end of a car; but a similar plate may be screwed on the back (making really two fronts) when the machine is to be placed centrally in a car, so as to present the same name in the apertures of both ways. In such case the cards must be printed on both sides, and in such manner as always to come right at the apertures when moved or changed.

H, Figs. 1, 5, 8, and 9, is a box or tubular projection intended to descend to the bottom of the car, and through which the chains *l* and *l'* lie and move. The upper part of this box is provided with partitions I and I', to confine the spiral springs R and R'. These spiral springs have caps Z, Z', and Z' attached at the ends, and through the center of each is a hole just admitting the free passage of the wire rods *h* and *h'*, which are connected with the chain F above, and with the chain *j* below, which chain is somewhat larger in diameter than the rods *h* and *h'*; and the passage-holes for the chain F in the plate bottom D', and of those in the bottoms of the partitions I and I' for the chain *j*, being sufficient for the free passage of those chains, as a consequence no movement can take place with those chains without contracting the spiral springs R and R', the one upward and the other downward, or vice versa.

The chain F being attached to the top of the pulley E, and the chain *j* being attached to the bottom of the pulley G by the pin K, it is obvious that any movement of those pulleys to the right or left will contract the spiral springs R and R', which will immediately, if unobstructed, return to equilibrium, thus bringing always the sliders N and N', when at rest,

at a point from which they may immediately act upon the cards either upward or downward.

J is a brace between the partitions I and I' for the reception of screws which attach a cover to the box H, and which cover forms, with the back of H, supports for the pulley G, into which it is journaled.

The black square in the center of the pulley G represents a hole, in which an angular key-shank may be inserted for setting or working the machine by hand.

The pin *m*, inserted in the top of the pulley G, Figs. 1 and 5, forms the attachment of the descending chains *l* and *l'*, which, passing downward through an aperture in the bottom of the car, (see Figs. 8 and 9,) are attached to the bottom of the lower pulley, 8. (See, also, Fig. 10.)

6 and 7 are small pulleys to bring the chains *l* and *l'* into line with each other.

The pulley 8 has a pinion at one end, which is worked by a rack on the end of a wrought-iron rod or bar, the whole being supported by a cast-iron case, 5, bolted onto the bottom of the car. The other or inner end of this bar passes the longitudinal center of the car and rests or slides in a support, 4, bolted to the bottom of the car. This support must admit of some upward play of this end of the bar. On this bar a notch, 2, is made, which will lie directly over the center of the axle X when the bar is at equilibrium. This bar is propelled backward or forward by a notched lever, Z, which rises perpendicularly from the axle X, the notch of the lever fitting the notch in the bar 2. The axle X is journaled into a long apron, V, by one end, and into a shorter apron or support, W, by the other end. A spiral spring, 1, of sufficient strength, surrounds this axle at the end, entering the short support W. This spiral spring 1 has one of its ends made fast to the support W, the other end being made fast to the axle X; consequently, if the lever Z be pushed backward or forward, it must, by the agency of the spiral spring 1, return to its vertical equilibrium when not obstructed. Y is another lever, descending from the axle X in a line perpendicular to that of the lever Z. This lever Y hangs immediately over the outside of the outer edge of the rail 10, and its lower end, when the car is empty, should run about three inches above the top of the rail. This lever is operated, when the car is in motion, by an iron trip, 9, which rises just outside of the rail to the height of about four inches above the top of the rail. This trip should be highest in the center and slope away to both ends, and should be located at such exact points on the road as the automatic action of the indicator is required.

The apron V should be of wrought-iron plate of sufficient strength, and should descend from the bottom of the car closely outside of the lever Y, which is journaled into it to the same depth that the lever Y descends, so as to form

both a support and protection to the lever Y. The pinion on the pulley 8, when at equilibrium, may have a tooth deficient on each side of the central downward tooth, and the rack 3 may have several teeth deficient in the center. This will admit of the perfect automatic action, and also of the independent action, of the indicator by means of the hand and key, when required.

The card (see Fig. 7) should be of good stiff, springy, white card-board. It should be cut into slips of a proper length and width. Slips of sheet-brass or iron-sheet must be struck onto each end of the card, which may be printed upon before or after such mounting. The cards when complete must all be of a standard length and breadth and thickness at the mountings. The card thus perfected is really the starting-point from which the indicator is to be made up, as from the determined length of the cards, and the breadth, width, and thickness of their mountings, must be determined the actual size of the indicator and every piece of machinery connected with it.

The indicator is operated by the movement of the cars over the track. The trips (see 9, Figs. 8 and 9) are located on the track near each cross-street, public building, or notable place to be passed.

In passing each one of these trips the lever Y, sliding over the top of the trip, is turned backward, thus turning the lever Z with its notched upper end forward, which carries with it forward the rack-bar, which, engaging the teeth of the pinion on pulley 8, causes it to turn just one-quarter of its circumference. This quarter-revolution of pulley 8 when the car is empty will not be increased by a loaded car, for the loaded car, bringing the lever Y nearer to the top of the rail, will only cause the notch of the upper lever, Z, to pass out of the notch 2 of the rack-bar and re-enter it again when relieved from the trip, as the spiral spring 1 on the axle X will always restore equilibrium to all the machinery connected with it. Thus a car moving forward in one direction will cause one full stroke of the indicator for every trip passed over, and the same car returning will reverse all it did in the same manner.

The pulleys 8, G, and E, must all be of the same diameter, so that when a quarter-revolution of pulley 8 is made the same is transmitted by the chains *l* and *l'*, through pulley G, to pulley E inside of the indicator.

The sliders N and N' being driven up or down from their equilibrium by the little steel pulleys M, and these little pulleys being set to act in opposition, it is obvious that when the slider N goes up the slider N' will go down, or vice versa.

If the slider N pushes a card from the lower gallery to the upper, the slider N' must at the same moment pull down a card from the upper gallery to the lower on the opposite side of the machine, or vice-versa, (see Fig. 4;) and if the movement of the sliders be continued in

one direction by as many impulses as there are cards in the machine, a complete rotation of all the cards will have been accomplished, which may be as completely reversed by reversing the action of the machine.

The peculiar arrangement of eight springs, (marked S and S',) four of which are shown in Fig. 4, is to vibrate the two entire galleries of cards backward or forward in opposition to each other. When the machine is in equilibrium these springs S, S', S'', and S''' merely hold each gallery of cards suspended between them. Now, if the slider N moves upward, its butting-point *r'* will raise its spring S', while at the same moment the point *r* of slider N' will raise its spring S''. In consequence of this the spring S will press the entire upper column of cards backward or to the right, while the spring S''' will press the entire lower column of cards forward or to the left. Slider N will then, continuing its upward course, push a card from the front of the lower gallery up under the spring S to the front of the upper gallery, while slider N' pushes a card from the back of the upper gallery down under spring S''' to the back of the lower gallery. The complete stroke being made and the sliders returned to equilibrium, the reverse action may be made.

Having described my invention, I do not claim the presenting of the names of streets or stations at an aperture in front of a box, as that is old. I am also aware that linked cards and various other modifications of the old printed band of cloth or paper moving upon rollers has been made. I am also aware that station-indicators placed inside of railway-cars

have been worked automatically by means of a beveled projection placed centrally or within the track-way acting on a roller at the lower end of a vertically-moving rod. I am also aware that indicators have been made to reverse their indications both automatically and by hand. All of which principles being old, I claim none of them, broadly.

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

1. The combination of the slider N with the springs S, S', S'', and S''', as arranged in the box-frame C, C', D, and D', for the purpose of indicating streets, stations, names, or numbers by means of separate printed cards operated in continuous rotation either directly or reversely, substantially as described and set forth.

2. The combination of the pulley E with the pawls *f* and *f'*, chain F, spiral springs R and R', and with the crank-wheels L and L', substantially as described, and for the purpose set forth.

3. The combination of the indicator above described with the setting-pulley G, substantially as described, and for the purpose set forth.

4. The combination of the chains *l* and *l'*, the pulley and pinion S, rack 3, bar 4 and 3, with its notch 2, forked lever Z, lever Y, axle X, with its spiral spring 1, and the trip 9, as arranged, substantially as described, and for the purpose set forth.

J. B. ALEXANDER.

Witnesses:

F. A. LEHMANN,
T. C. CONNOLLY.