No. 693,377. Patented Feb. 18, 1902.

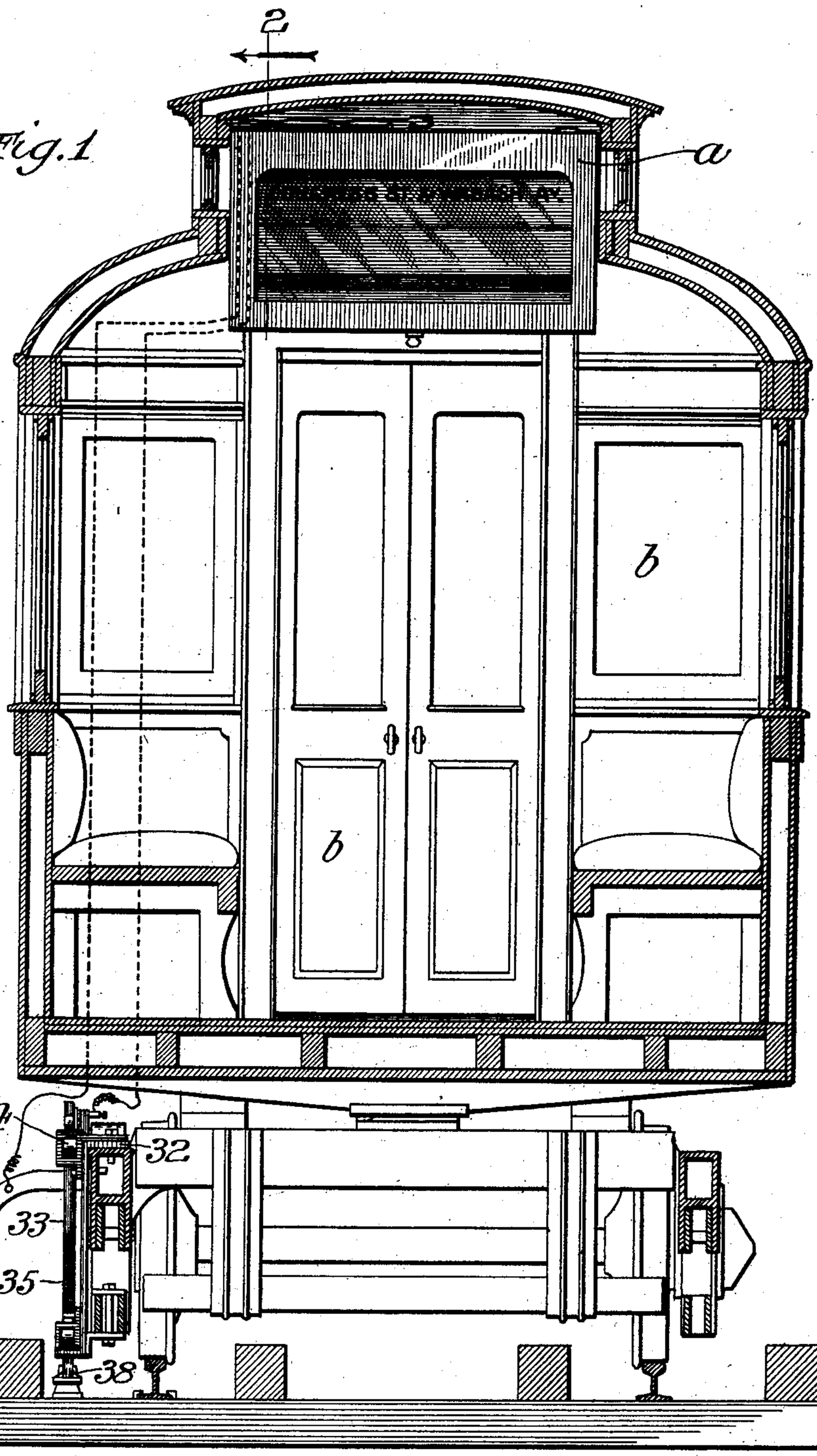
A. COPE.

STATION INDICATOR.

(Application filed Feb. 18, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1



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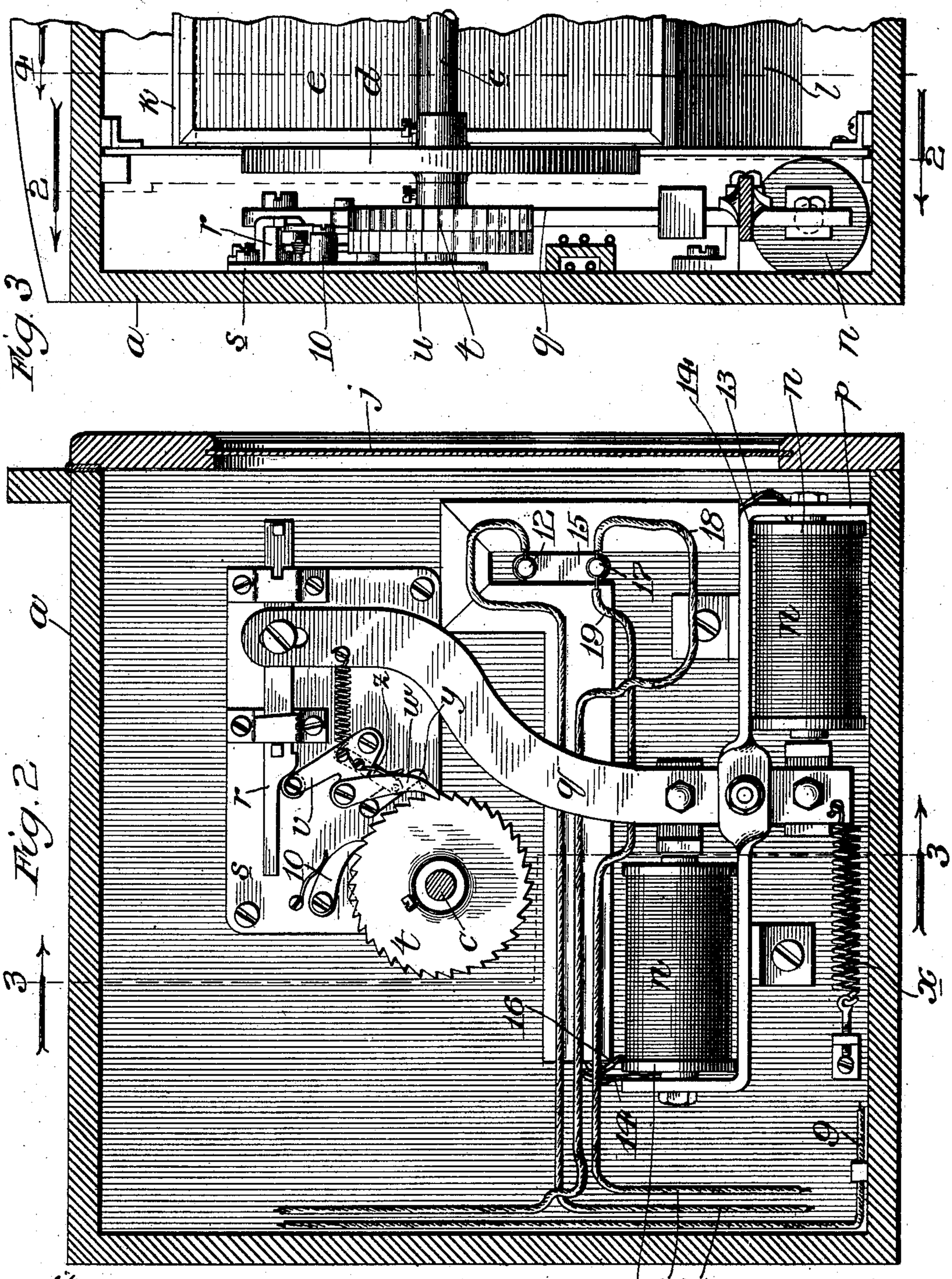
(No Model.) 4 Sheets—Sheet 2.



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(No Model.) 4 Sheets—Sheet 3.

Fig. 5

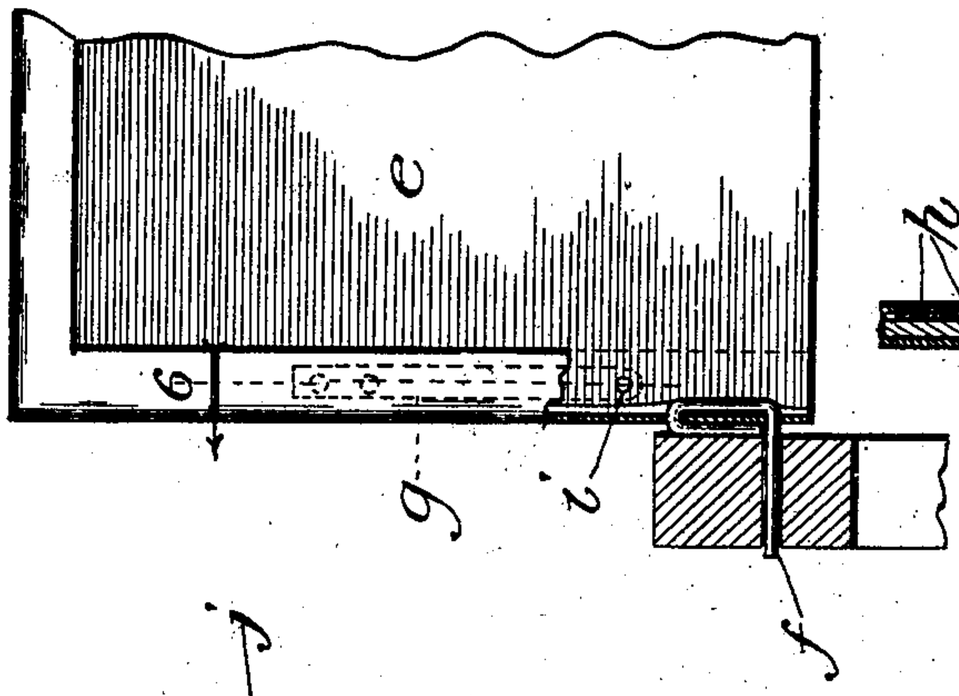


Fig. 6

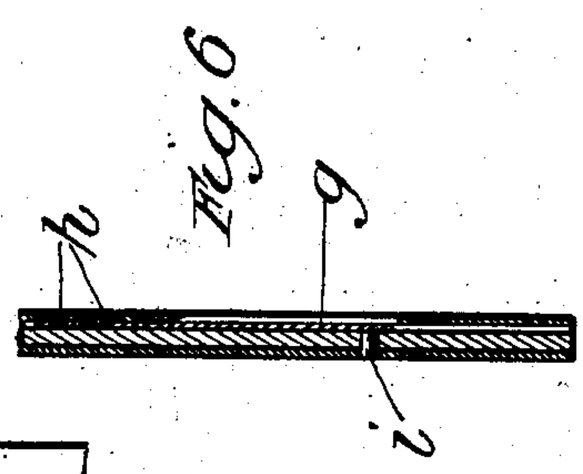
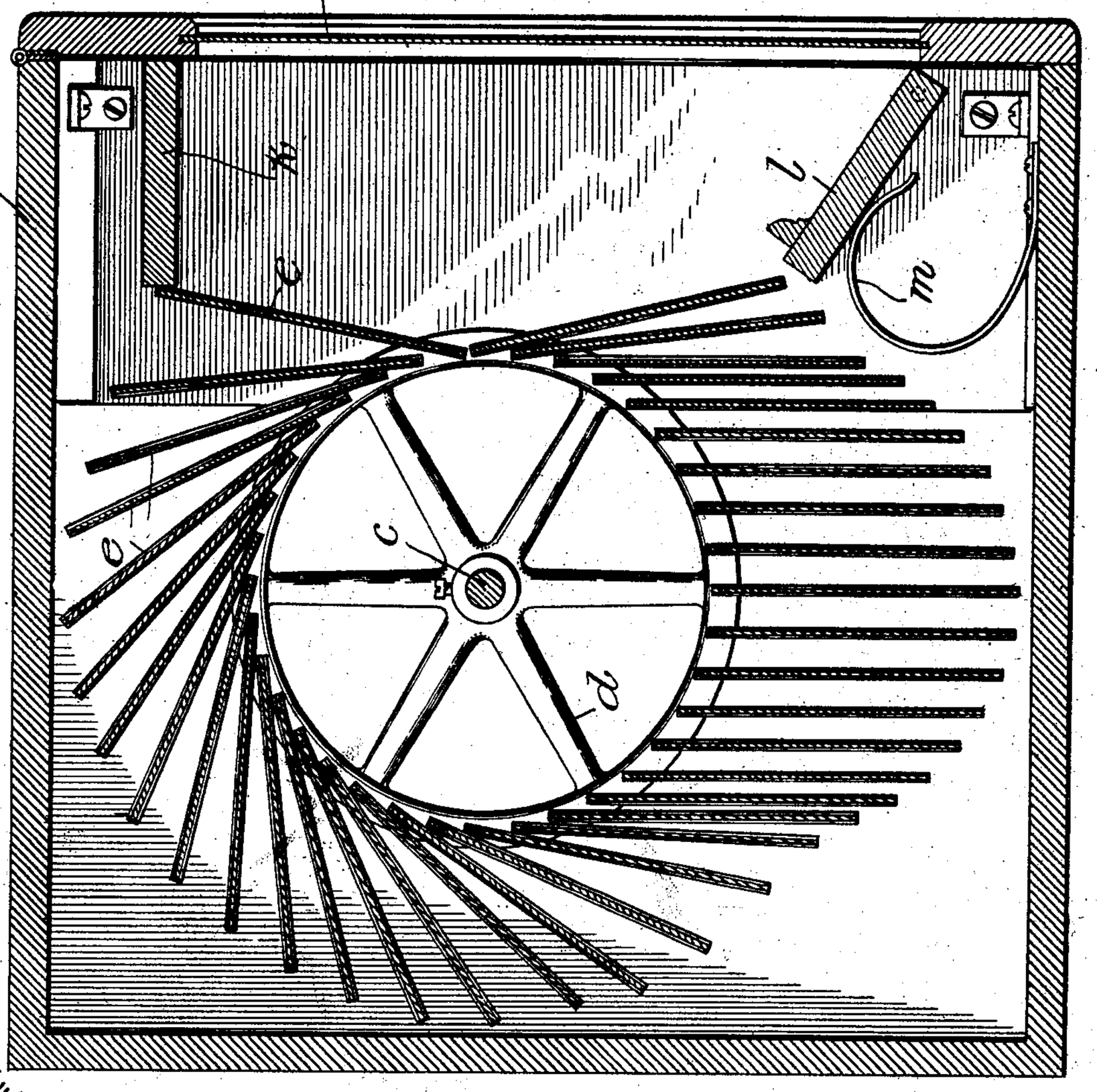


Fig. 4



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No. 693,377. Patented Feb. 18, 1902.

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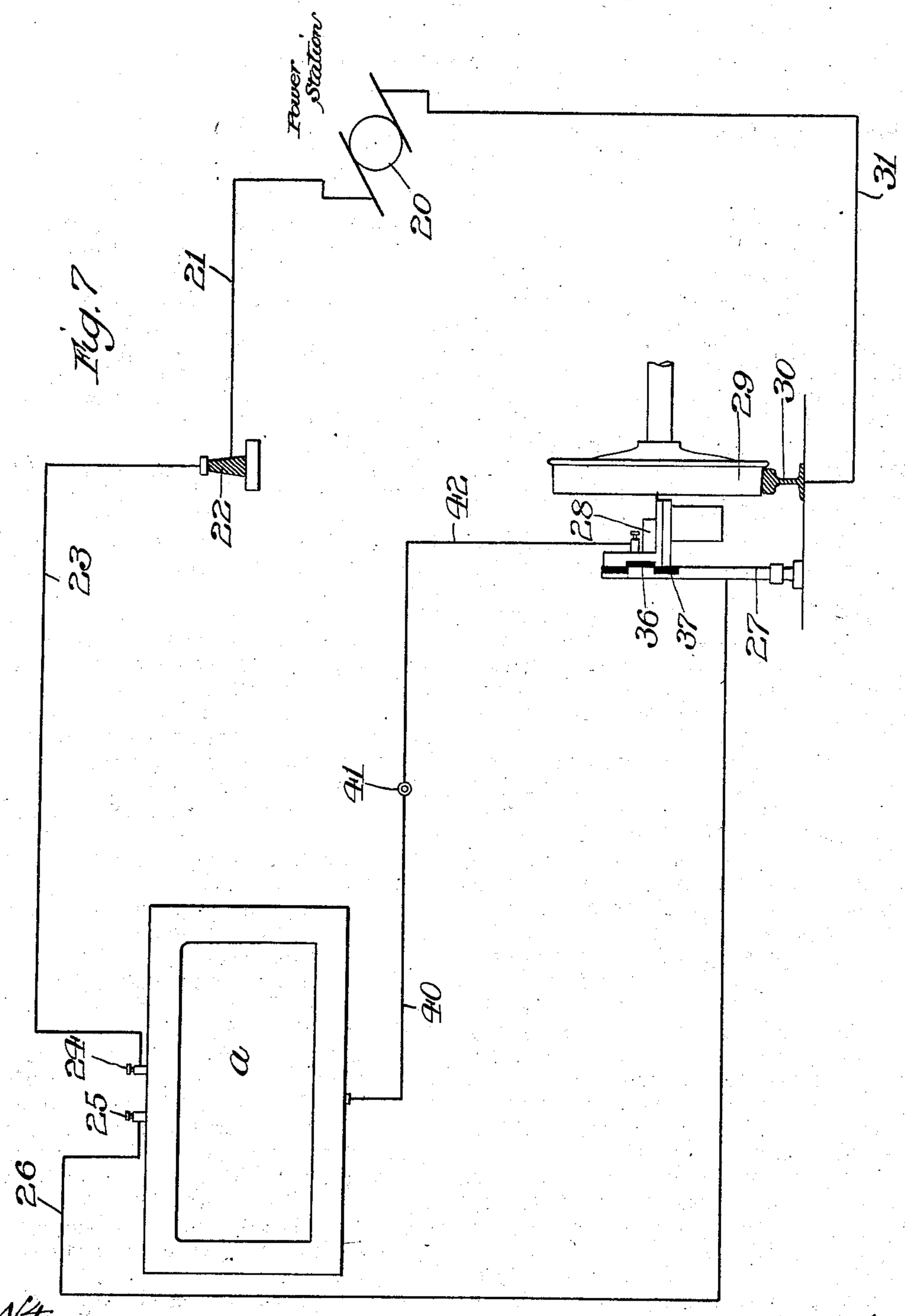
(Application filed Feb. 18, 1901.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 7



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UNITED STATES PATENT OFFICE.

ARTHUR COPE, OF CHICAGO, ILLINOIS.

STATION-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 693,377, dated February 18, 1902.

Application filed February 18, 1901. Serial No. 47,825. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR COPE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Station-Indicators, of which the following is a specification.

This invention relates to that class of indicators which is adapted to be used in rail or tramway cars to show an approaching station, and particularly to the means by which the indicator is operated, all of which will more fully hereinafter appear.

The principal object of the invention is to provide a simple, economical, and efficient indicator.

A further object is to provide an indicator with a rotatable head carrying a series or plurality of plates indicating a number of stations and means for operating the same as the car approaches a desired station or series of stations.

Further objects will appear from an examination of the drawings and the following description and claims.

The invention consists principally in a station-indicator in which there is combined a rotary head having a plurality of index cards or plates attached thereto, electromagneto devices for rotating the same, and means for automatically operating the electromagneto devices as the car approaches a station.

The invention consists, further, in a station-indicator in which there is combined a rotary head provided with a plurality of index-plates pivotally attached thereto, pawl-and-ratchet mechanism for operating the head, electromagneto devices for operating the pawl and ratchets, and a make-and-break switch adapted to be automatically opened and closed as the car approaches a station to supply energy for the electromagneto devices and operate the index-carrying head.

The invention consists, further, and finally, in the features, combinations, and details of construction hereinafter set forth.

In the accompanying drawings, Figure 1 is a transverse sectional elevation taken through a tram-car and fitted with my improvements; Fig. 2, an enlarged sectional view of the indicator-operating mechanisms, taken on lines 2 of Figs. 1 and 3; Fig. 3, a sectional elevation of a portion of the mechanism, taken on lines 3 of Fig. 2 looking in the direction of the arrow; Fig. 4, a cross-sectional view taken on line 4 of Fig. 3 looking in the direction of the arrow; Fig. 5, an enlarged detail view of a portion of one of the index-plates, showing the means of pivotally securing it to the rotatable head; Fig. 6, a sectional detail taken on line 6 of Fig. 5, and Fig. 7 a diagrammatic view of the electric circuits.

In the art to which this invention relates it is well known that it has been for a long time desirable to obtain a station-indicator which would indicate the name of the approaching town or station, one that could be operated either automatically or by hand, and which would be economical to construct, simple to understand, and efficient in operation.

The principal object, therefore, of my invention is to provide a simple and economical station-indicator which will be efficient in operation and can be operated either automatically for the purpose of indicating the station or with the assistance of the trainman, the details of which will more fully hereinafter appear.

In illustrating my improvements I prefer to show them as attached to a car such as is used on elevated railroads and in which the third-rail electric system is employed; but while I have illustrated a portion of such a car I do not deem it necessary to illustrate or describe the car in detail, and so will merely describe what I consider to be new and novel, taken in connection with so much of the car as will enable those skilled in the art to practice the invention. It will be further understood that the invention is applicable either to steam or electrically-actuated cars with very slight modifications or changes in the arrangement and construction of details, all of which can be supplied by the ordinary mechanic without departing in the least from the spirit of the invention.

In constructing a station-indicator in accordance with my improvements I provide an inclosing case or box *a* of the desired size, shape, and strength to contain and protect the operative and other mechanisms in position for use. This case is supported, as shown in Fig. 1, in the upper end portion of a car *b*, and, if necessary, the other end of the car

may be provided with a similar indicator, though I will only describe one and the operating mechanisms therein contained.

Rotatably mounted in the inclosing case is a main shaft *c*, carrying two spiders or wheels *d* at or near each end thereof, and which, in connection with the shaft, form what I prefer to term a "rotatable head." This head is provided with a plurality of index-plates *e*, pivotally secured thereto, as shown in Figs. 4 and 5, by means of the wire pivots *f*, which are preferably formed of a metal frame, hollowed out or U-shaped in cross-section, into which the card portion may be removably inserted. To hold the card portion in the hollow metal frame, a retaining-spring *g* is provided, riveted to the frame at *h* and provided with a pin *i*, adapted to be passed through a perforation in the card to hold it in position. The portion of the frame to the rear of this retaining-spring is slotted, so that the pin may be pulled out for the purpose of removing the card and also to permit the retaining-spring to yield while the card is being inserted.

As shown in Figs. 1 and 4, the front of the case or box is provided with an opening in which is inserted a glass pane *j*, which enables the passenger or employee to look through the same into the box and see the name of the station which is on the upper index-plate as it is exposed to view. It will also be seen that as the head is rotated (by the means hereinafter described) the plates are brought successively into the position shown in Fig. 4, where they contact an inwardly-projecting board *k* and are retained thereby until the desired movement is obtained previous to the arrival at the next station, when the plate is allowed to swing down into the position shown in said figure and expose its unmarked side, while permitting the marked or indicating side of the next succeeding plate to be exposed to view. A yielding board *l* (shown in Fig. 4) is provided and pivoted to the inclosing case, resting against a yielding spring *m* for the purpose of providing a screen to hide the lower edges of the index-plates and other mechanism from the passengers or other persons in the car.

To provide means for operating the rotatable head, a pair of electromagnets *n* and *o* are provided, secured to a frame-bar *p*, which in turn is secured to one end of the inclosing case, as shown in Fig. 3. Pivotally mounted to this bar and between the electromagnets (which in this instance are single spools having a fixed iron core) is an armature-lever *q*, carrying projecting metallic armatures arranged in line with and adjacent to the cores of the magnets. The outer end of this armature-lever is loosely engaged with a sliding bar *r*, reciprocatingly mounted in a plate *s*. Two oppositely-arranged ratchet-wheels *t* and *u* are provided and secured to the shaft of the rotatable head, so that as the free end of the armature-lever is moved forward by the magnetic pull of the magnets the sliding bar *r* contacts a roller on a vibrating lever *v*, which being provided with a spring-pressed pawl *w* moves said pawl downward, and consequently moves the rotatable head one step in its rotation. As the magnetic circuit is broken a helical spring *x* pulls the armature-lever backward, which action permits a pivoted detent *y*, which is connected with the vibrating lever *v* by means of a link *z*, to engage the other ratchet-wheel *u* and limit the forward movement of the rotatable head. It will be seen that this detent has a hooked free end, which enables it to engage the ratchet-wheel *u*.

To prevent a backward rotation of the rotatable head, a spring-pressed dog 10 is provided and pivoted to the plate *s* to engage the teeth of the ratchet-wheel *t*. It will thus be seen that by the mechanism above described the rotatable head is prevented from being rotated backwardly at any time and only allowed to be rotated forwardly when all of the mechanisms are in operation.

The wiring necessary to provide the electromagneto energy, or, in other words, to furnish a supply of current from a source of energy, is shown very clearly in Figs. 2 and 3, in which the wire 11 is arranged to be connected with the third rail and leads to the post 12, (shown in Fig. 2,) from which it passes by means of a wire 13, arranged under plate 15, to the core of the magnet *n*, thence through the windings of such magnet out through the wire 14, again underneath plate 15, out from underneath the same to contact the core of the magnet *o*, through said core and around the coil of the spool of said magnet, thence through wire 16 and again underneath plate 15 to post 17, where it divides, either through wire 18 to a second indicator or back by wire 19 to a metallic portion of the car-truck, and through the same to the ordinary rail to power-house or ground. Another wire 9 is provided for an emergency-wire, which will be more fully hereinafter described in connection with the diagrammatic view.

In the diagrammatic view I have merely shown the casing *a*, which is supposed to contain the electromagneto devices above described. Tracing the circuit in connection with the same, current flows from the dynamo 20 in the power-house through wire 21 to the third rail 22, thence by means of a wire 23 to the post 24, which is the same as post 12 in Fig. 4, thence through the electromagneto devices, as above described, to operate the same to post 25, and thence by wire 26 to a sliding-bar switch 27. When such switch is in electric contact with the frame 28, current passes out through the same, thence through the wheel 29 to the ordinary rail 30, and back by wire 31 either to power-station or ground.

It will be seen from the foregoing that the electromagneto devices are operated every time current is supplied to the spools and that consequently current should be cut off

from such spools at all times, excepting just previous to the arrival of the car at the desired station, when the current should be again supplied for the purpose of furnishing sufficient magnetic energy to operate the devices. In order to accomplish this, I provide what I term a "sliding-bar switch," composed of a holder 32, which is secured to the truck or metallic portion thereof and in which is slidingly mounted a vertically-movable bar 33, operating in a saddle in the holder and also against antifriction-rolls 34. The bar is of sufficient weight in itself to be operated by gravity; but in order to provide for its remaining in its normal lowest position a couple of helical springs 35 are provided. The holder is provided with an insulated portion 36, as is the upper end of the sliding bar at 37, so that when the parts are in their normal position, as shown in diagrammatic view, they are not in electric contact with each other—in other words, the circuit is broken; but when the sliding part is elevated or raised the insulated parts are in contact with each other and the metallic bar in electric contact with the holder, thereby closing the circuit and permitting current to pass from one part of the switch to the other, so that it may flow to the electromagnets, as above described. In order to operate the switch, the trestle or one of the sleepers may be provided with an upwardly-projecting portion 38, so arranged that as the car is moved the shoe on the sliding-bar switch contacts the same, closes the electric circuit, and operates the electromagneto devices, above described, and thereby the rotatable head. After the necessary energy has been supplied the car quickly passes this projection, the sliding bar again drops to its normal position, the circuit is broken, and the mechanisms are left in position to be again operated as the succeeding station is approached.

It may be possible that the sliding-bar switch may refuse to operate or the connection be broken, and as a consequence the circuit would remain open and the devices inoperative. In order to provide for such contingencies, a supplementary wire should be supplied to provide an emergency-circuit. I have shown this in diagrammatic view, in which a wire 40 leads out of the box and is connected to practically the same post as the wire 26. This is connected with a push-button 41, which when pushed inwardly closes the circuit through wire 42 to the metallic frame of the truck, so that when such emergency-circuit is closed current would flow from the dynamo through wire 21, third rail 22, wire 23, post 24, through the electromagneto device above described, thence through wire 40, push-button 41, wire 42, and back to the power-house, as above. From this it will be seen that current can be supplied by hand to operate the mechanism whenever it may seem desirable or necessary.

I claim—

1. In a station-indicator, the combination of a rotatable head, a plurality of indicating-plates pivoted thereto, two ratchet-wheels oppositely arranged secured to such head, a vibrating lever provided with a spring-pressed pawl engaging with one of the ratchets to move it in a forward manner and with a detent engaging the other ratchet to limit the forward movement, a reciprocating slide in engagement with a vibrating lever, electromagnetic-actuated mechanisms arranged to operate the vibrating lever and therethrough the other parts and means for automatically closing and breaking the electric circuit, substantially as described.

2. In a station-indicator, the combination of a rotatable head, a plurality of indicating-plates pivoted thereto, two ratchet-wheels oppositely arranged secured to said head, a vibratable lever provided with a pawl engaging one ratchet-wheel to move it forwardly and with a detent engaging the other ratchet-wheel to limit the forward movement, a reciprocating slide to operate the vibratable lever, an armature-lever in engagement with said slide to operate the same, and electromagnets for operating said armature-lever, substantially as described.

3. In a station-indicator, the combination of a rotatable head, a plurality of indicating-plates pivoted thereto, two ratchet-wheels oppositely arranged secured to such head, a vibratable lever provided with a spring-pressed pawl engaging one ratchet-wheel to rotate the parts in a forward direction and with a detent engaging the other parts to limit the forward movement, a pivoted armature-lever provided at one end with a reciprocating slide to contact the vibratable lever and operate the parts, two electromagnets arranged at each side of the pivot on the armature-lever to vibrate it in one direction, and a spring connected with such armature-lever to vibrate it in the opposite direction, substantially as described.

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