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TRAMWAY POINT.

APPLICATION FILED APR. 11, 1908.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

917,197.

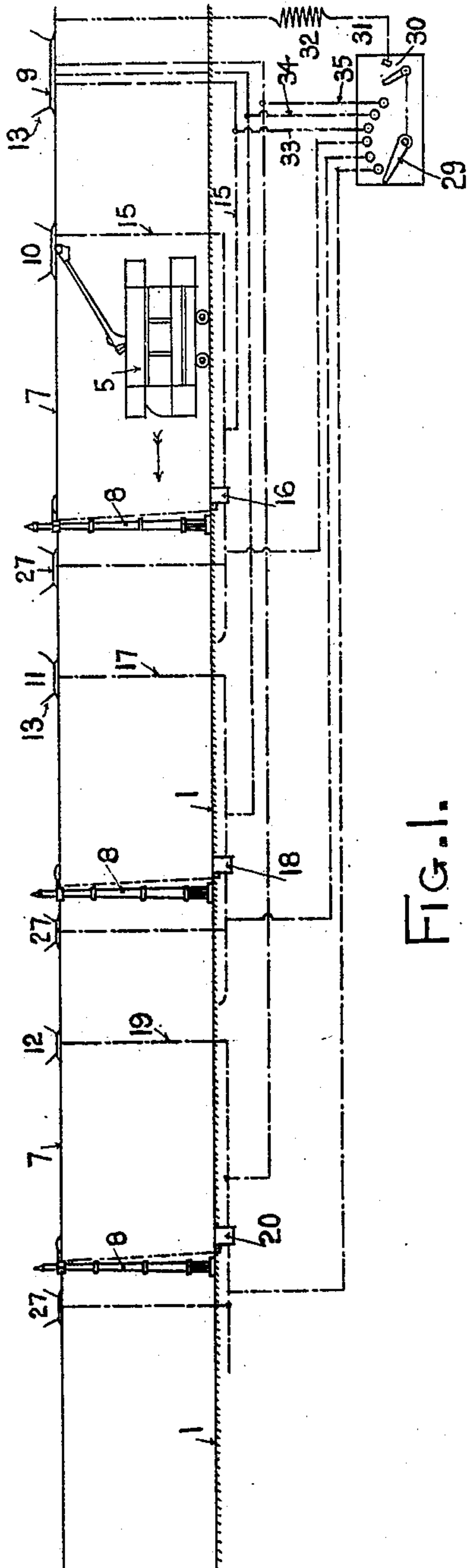


FIG. 1.

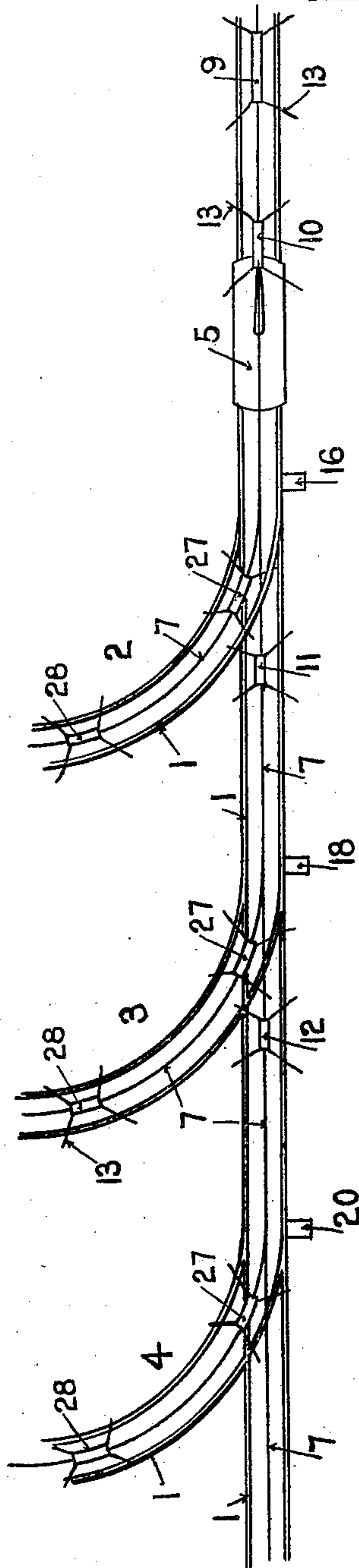


FIG. 2.

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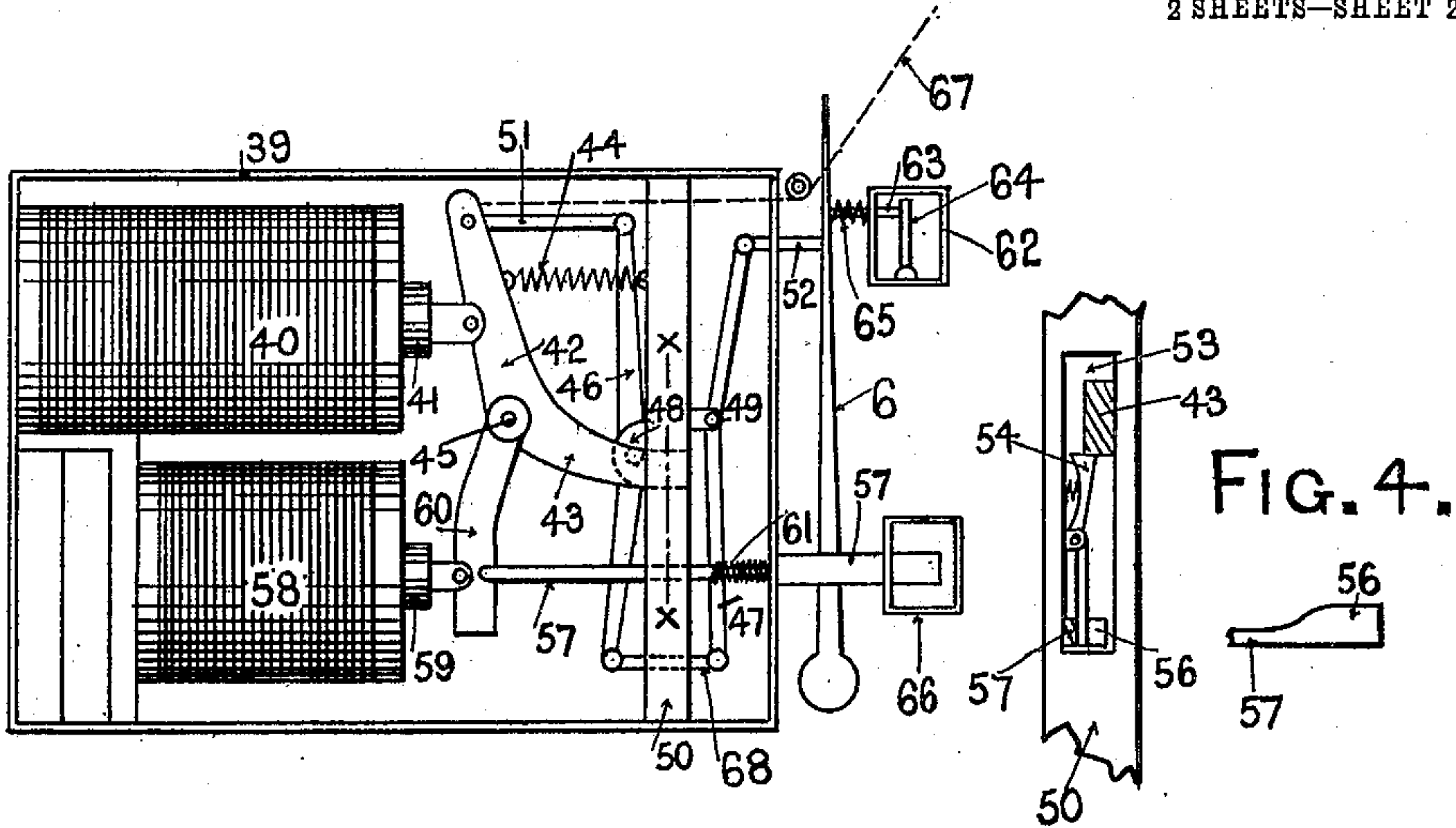


FIG. 3.

FIG. 4.

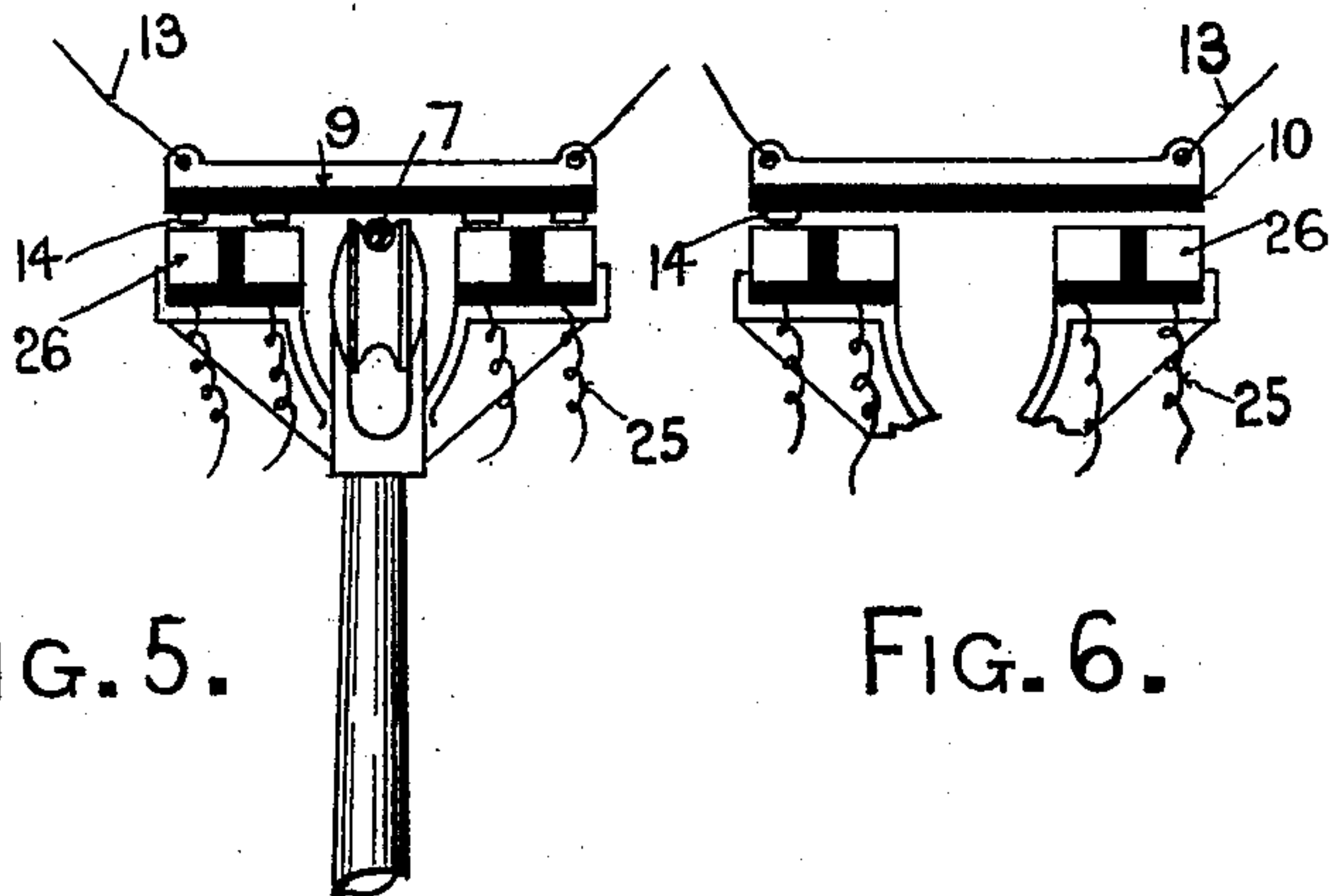


FIG. 5.

FIG. 6.

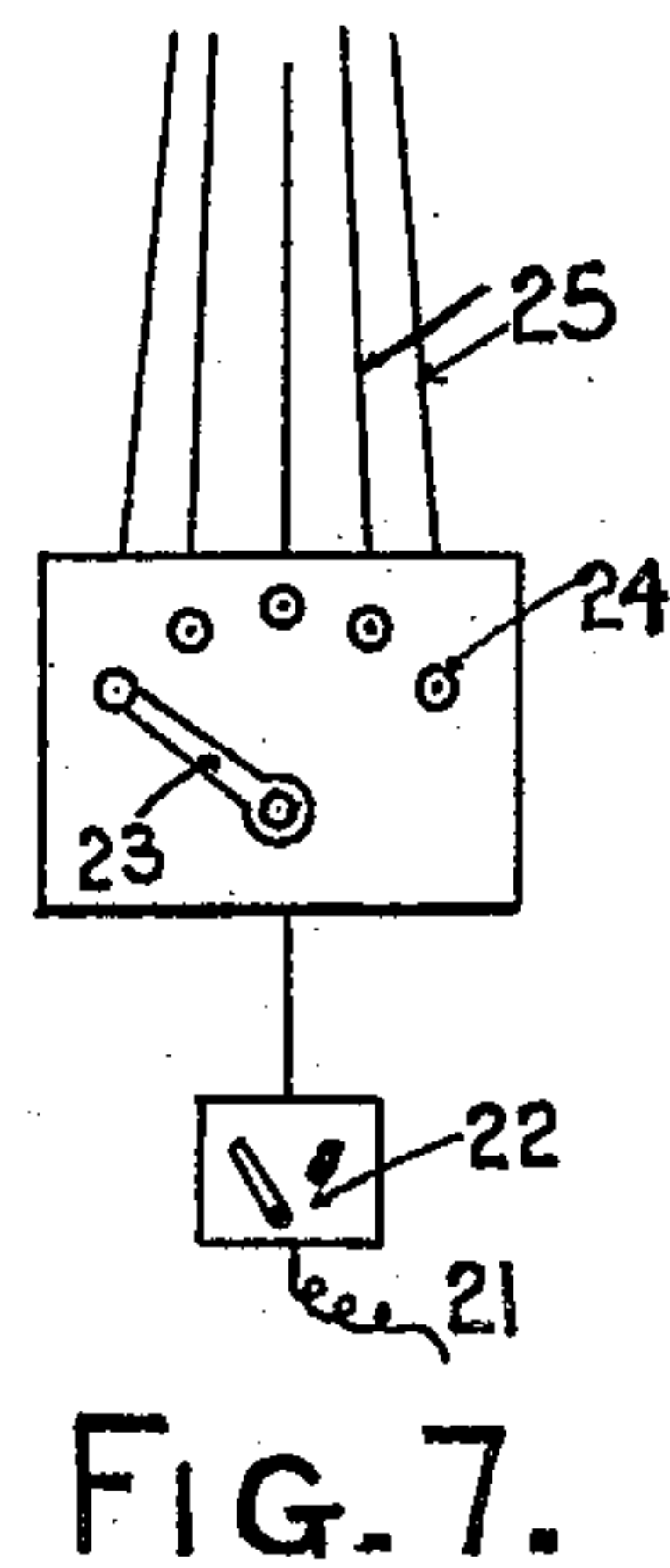


FIG. 7.

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UNITED STATES PATENT OFFICE.

EDMUND VEEVERS AND GEORGE HERBERT BUTTERWORTH, OF LIVERPOOL, ENGLAND.

TRAMWAY-POINT.

No. 917,197.

Specification of Letters Patent.

Patented April 6, 1909.

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To all whom it may concern:

Be it known that we, EDMUND VEEVERS and GEORGE HERBERT BUTTERWORTH, both subjects of the King of Great Britain and Ireland, residing, respectively, at 122 Vauxhall road, Liverpool, in the county of Lancaster, England, and 134 Liverpool road, Great Crosby, Liverpool aforesaid, have invented a new and useful Improvement in Tramway-Points, of which the following is a specification.

This invention relates to the points of rails such as are used with tramcars and the like of the kind that are driven by means of an overhead wire and trolley and it has for its object means whereby the points of said rails may be "set" or actuated at the will of the driver or motorman from the car while it is running.

According to the invention the car carries a switch hereafter termed the point switch (or it may be one at each end of said car) and according to the position of the handle or handles or plugs of this switch so will points which the car is about to approach be opened or left in their normal (closed) position. This opening of a point is effected by a solenoid which by means hereafter described pulls open the tongue of the point when said solenoid is energized, the tongue being automatically locked by a catch in its open position until again released by a second solenoid tripping the catch after the car has passed the point when it again resumes its normal (closed) position by reason of a spring. It will thus be seen that according to whether the various opening solenoids are energized or no so is the position of each of the points predetermined.

The frogs or points of the overhead wire have hitherto in the case of facing points been frequently manually actuated in one direction by a pull on a cord and according to our invention this cord is affixed to the core of the point actuating solenoid or to some part moving therewith so that the point tongue and the frog tongue move synchronously.

The solenoids and other mechanism for moving the points are preferably inclosed in road boxes the tops whereof lie about flush with the surface of the roadway and are removable so that access may be had to their interiors. These may conveniently be placed between the rails but for clearness of understanding we have shown them as at one side

thereof. The first portion of this specification will more especially describe the various circuits and overhead gear while the latter portion will describe the road box mechanism.

In the accompanying drawing, Figure 1 is a sectional elevation in diagrammatical form of our overhead system and showing also the electrical connections. Fig. 2 is a plan of Fig. 1. Fig. 3 is an enlarged plan view of the road box hereafter described. Fig. 4 is a detached section as on line $x-x$ of Fig. 3 and drawn to a still larger scale for the sake of clearness. Fig. 5 is an elevation of a trolley head and one of the contact plates hereinafter described. Fig. 6 is a similar view to Fig. 5 but showing another of the contact plates. Fig. 7 is a view of a switch suitable for use on the car and which may be so arranged in advance as to complete a desired circuit when a contact plate is reached.

We may in some cases use plugs and flexible connections, or have more than one handle on the switch so that two or more point circuits may be set in advance. These alternatives are well known.

Like designating characters refer to corresponding parts.

1, 1, are the rails and 2, 3, 4, represent respectively three branches thereof. A vehicle 5 traveling in the direction of the arrow Fig. 1 will normally and when all the points are closed follow along the main line 1, but should the tongue of any of the points (see Fig. 3) be pulled over so as to open the point then the vehicle when it arrives there will take one of the branch lines 2, 3, or 4, as the case may be.

7 represents the overhead live wire which may be supported by posts 8 or by span wires as usual.

9, 10, 11, and 12, show a series of what we term contact plates which are hung upon (or it may be adjacent to) the live wire 7 and they are also supported by span wires 13. They are made of insulating material and reinforced by metal for the purpose of slinging them. Each of these contact plates carries a metal contact 14 except in the case of the contact plate 9 see Fig. 5, which differs from the others in that it carries a plurality of contacts 14. This particular contact plate 9 we term the emergency contact plate and its construction and functions will be explained hereafter.

From the contact 14 on the contact plate

10 a wire 15 suitably insulated and conducted in any known manner leads to a point actuating solenoid in the point box 16 and from this box the point leading to the
5 branch line 2 is controlled.

From the contact plate 11 a wire 17 leads to the point box 18 from which the point leading to the branch 3 is controlled, and from the contact plate 12 a wire 19 leads to
10 the point box 20 from which the point leading to the branch 4 is controlled.

We wish it to be understood that the contact strips 14 on the contact plates 9, 10, 11, and 12, and consequently the wires 15, 17, 15 and 19, and the solenoids in the road boxes 16, 18, and 20, are normally dead or unenergized, and the points at the junction of the main line 1 and the branch lines 2, 3, and 4 are therefore normally closed, by means of a
20 point spring each which may be of any suitable construction and forms no part of our present invention.

Referring now to Fig. 7 which shows the switch carried on the car. 21 is a branch
25 from any convenient live wire on the car. 22 is a cut-out by means of which switch 23 may be made inert or live at will. 24 are contacts connected as by wire 25 (see also Figs. 5 and 6) to brushes or wipers 26. These brushes or
30 wipers 26 sweep over the contact strips 14 above mentioned and, if live, close a circuit to energize one of the solenoids for actuating a point.

It will thus be seen that when the car
35 reaches for instance the contact plate 10 that if the wiper 26 corresponding to the contact 14 thereon is live the solenoid in the box 16 will be energized and will pull over or open the point at the adjacent junction 2 and cause
40 the car to branch off, whereas should the wiper corresponding to said contact be dead (by reason of the switch 23 not having been placed so as to close its particular circuit) the point will be closed and the car will travel
45 straight on.

Referring now to Figs. 1 and 2, 27, 27, 27, represent additional contact plates by means of which the car having passed the opened point adjacent thereto and entered the
50 branch line, releases the catch by means of similar connections to those already described which cause a current to energize a releasing solenoid in the road box adjacent to the point that has just been passed.

55 We have shown three sets of points any one or both or all of which may be actuated in advance as above described. We do not wish to be confined to this number as it will depend on local conditions.

60 At the right hand side of Figs. 1 and 2, and also the Fig. 5 it will be seen that the first contact plate 9 carries a plurality of contact strips 14 and these are individually coupled each to its respective solenoid in advance.
65 This arrangement is intended for use in

emergency and it will be seen that with a multiple switch any or all of the points may be actuated in advance from this one place. This emergency contact plate 9 is also useful in such cases as where a car is pushing a disabled car in front of it and it is therefore necessary for the points to be actuated before the trolley of the rear car reaches the adjacent contact plates. In other words the series of points may be "set" in advance on
75 passing the emergency contact plate 9. We provide also additional releasing contact plates 28, 28, 28, (Fig. 2) coupled up to the respective points adjacent to (behind) them and these are only intended for use when a
80 car is pulling a disabled car after it. These emergency releasing contact plates 28 are used instead of the usual releasing contact plates 27 under such circumstances because being a greater distance past the point they
85 do not come into operation to re-close the latter until the active car dragging the disabled car after it has pulled the latter well clear of the point. In such case immediately the active car has opened the point its switch is
90 opened by the motorman so that on its arrival at the ordinary closing contact plate 27 it will not close the point that has just been passed but will let it remain open long enough for the trailing vehicle to enter the
95 branch, and it is only when the emergency plate 28 is reached by the active car that the point is again closed, the switch having meanwhile been closed to effect that purpose. In Fig. 5 we show four contact
100 strips 14 and in the system we describe only three of these are used. When however a fourth point has to be negotiated the fourth strip 14 will be used to actuate it. Others may be added if desired.
105

We provide also an auxiliary electrical operating and releasing switch 29 see Fig. 1, which is preferably mounted in a box affixed to one of the standards or it may be in a cabin for instance. This switch may as in
110 the former example be cut out by an auxiliary cut-out 30. 31 is a branch wire leading from the overhead wire 7 through a suitable resistance 32 and the various poles on the switchboard are connected by wires 33, 34,
115 and 35, with the solenoid wires 15, 17, 19 respectively and the poles 36, 37 and 38, are connected to the respective releasing contact plates 27 each by a branch wire as shown. It will thus be seen that any one of the points
120 may be "set" or released at will from this station, which is intended to be used as an additional means of actuation in emergency.

Referring now more particularly to Figs. 3 and 4. 39 shows the sides of the road box
125 which is normally closed by a suitable cover. 40 is the coil of the solenoid for actuating the tongue 6 of the point in one direction by means of its core 41 pulling on an arm 42 of an elbow lever 42 and 43. The return of the
130

point to closed position is effected by a spring 44. 45 is the pivot for elbow lever 42, 43. We provide two rocking levers 46 47, which are pivoted in jaws or brackets 48, 5 49, to a bridge piece 50 which spans the road box. The arm 42 is coupled by a link 51, to one end of rocking lever 46 and the other end of the latter is, by means of a link 68 coupled to one end of lever 47. The other end of this 10 rocking lever 47 is coupled to the tongue 6 as by a link 52. It will thus be seen that a pull on the core 41 opens the tongue 6.

In the bridge piece 50 is a slot 53 (see Fig. 4) in which the other arm 43 of the elbow lever aforesaid swings and 54 is a detent to retain it in open position against the influence of spring 44. The tail 55 of the detent is raised to release said arm 43 by reason of an inclined lump 56 on a rod 57 which is 20 pulled inward by the releasing solenoid 58 above described, whose core 59 is coupled thereto by means of an anchor link 60 also pivoted on pivot 45.

61 is a spiral spring that normally pulls 25 the core 59 partly out from its coils 58.

62 is a subsidiary road box into which a rod 63 attached to tongue 6 protrudes and is attached to a swinging lever 64. 65 is an auxiliary spring helping to close said tongue 30 6. The object of this subsidiary road box and its adjacent mechanism is to allow the point tongue 6 to be manually operated by means of a lever or crowbar when it is desired to open the points without the use of 35 the electric devices in case of breakdowns for instance. A second subsidiary road box 66 is also provided into which the end of the rod 57 projects and this also may be shot back mechanically so as to allow the 40 point to close. These two road boxes are usually covered by lids (not shown).

67 (Fig. 3) shows a portion of the cord or cable by means of which the points on the overhead frogs are pulled as above described.

We claim.

1. In tramway points the combination of a point actuating contact plate adjacent to each point whereby said point may be opened on the arrival of the trolley head at said contact plate, a point releasing plate 50 whereby the point may be closed when the trolley head reaches it after the points have been passed by the vehicle, and a second point releasing contact plate at a farther distance past the point adapted for use in 55 emergency, substantially as described.

2. In tramway points the combination of an elbow lever movable synchronously with the point tongue a solenoid adapted to pull said lever in one direction, a spring adapted 60 to pull it in the other direction, a catch adapted to drop in the path of said elbow lever to retain it in one position against the influence of said spring, with a second solenoid having a rod with an inclined lump on it 65 attached to its core whereby when said inclined lump is pulled under the tail of the catch the latter is tripped, substantially as and for the purposes set forth.

3. In tramway points a road box containing point actuating and releasing mechanism 70 and which has two protruding rods connected to the same, the combination therewith of two auxiliary road boxes which contain the free ends of said rods whereby the 75 point tongue may be mechanically operated, substantially as described.

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