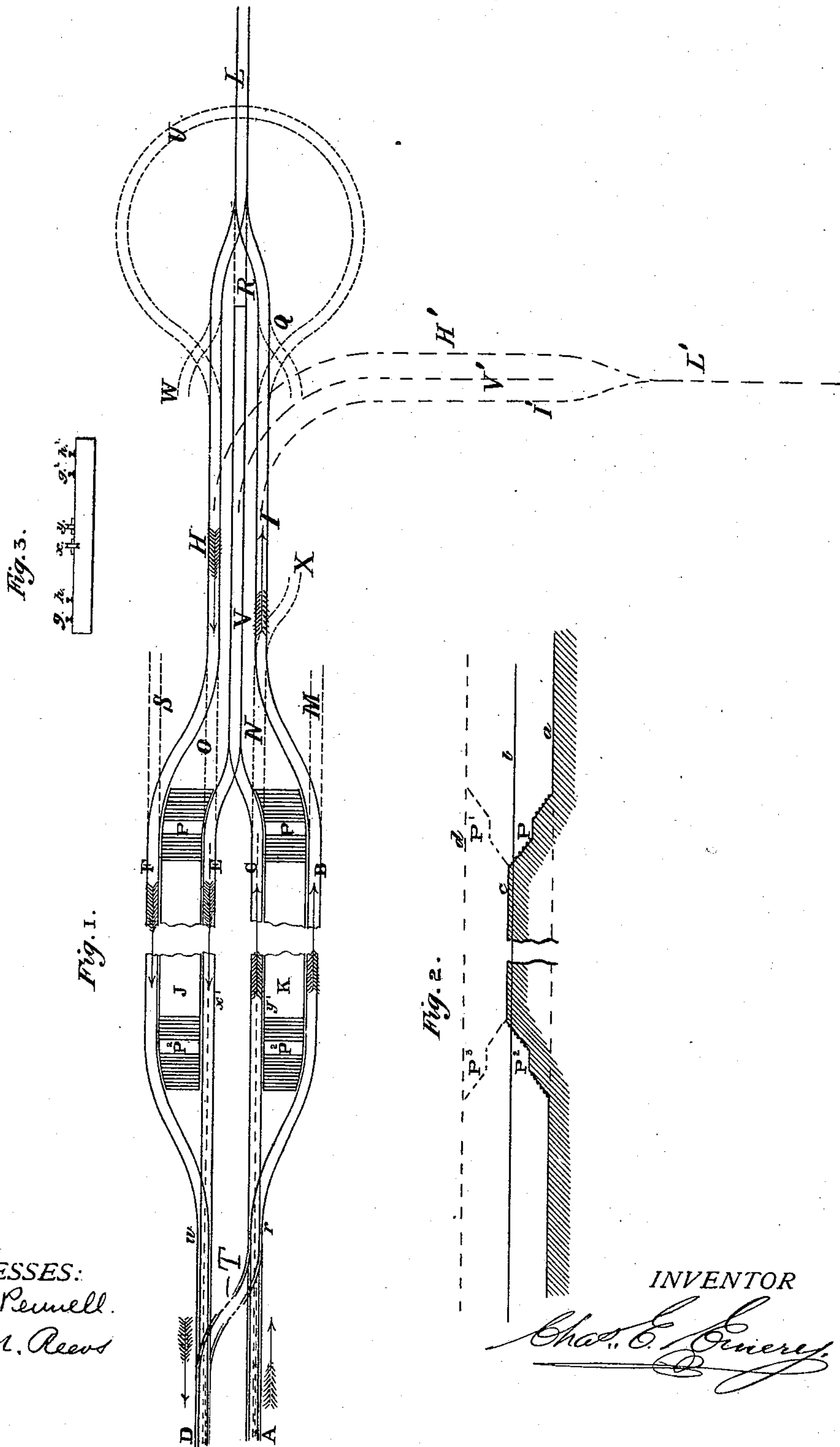


(No Model.)

C. E. EMERY.
CABLE SUBURBAN RAILWAY.

No. 430,178.

Patented June 17, 1890.



WITNESSES:
George C. Pennell.
Robt. M. Rees

INVENTOR

Chas. E. Emery

UNITED STATES PATENT OFFICE.

CHARLES E. EMERY, OF BROOKLYN, NEW YORK.

CABLE SUBURBAN RAILWAY.

SPECIFICATION forming part of Letters Patent No. 430,178, dated June 17, 1890.

Application filed April 13, 1889. Renewed April 19, 1890. Serial No. 348,590. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. EMERY, of Brooklyn, Kings county, New York, (office New York city,) have invented certain new and useful Improvements in Cable Suburban Railways; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

In the operation of railroads designed to furnish means of communication from the business districts of cities to the residence districts or suburbs a very great concentration of travel occurs morning and evening, requiring the use of long trains at very frequent intervals. The problem of so operating trains that there will be no danger of collision and of providing means to receive and discharge passengers in the limited time allowed is a serious one. When trains are running at frequent intervals, if one be stopped at a station on the main line to receive or discharge passengers, the train immediately following will rapidly approach the rear of such train during the time not only of the stop, but while the train ahead is moving at reduced speed in stopping and starting. In practice the trains must be kept sufficiently separated so that the following train will not be in danger of striking the rear of the standing train in case of unavoidable delays.

In application Serial No. 263,295 an arrangement of multiple station-tracks is shown, whereby alternate trains in the same direction are run to different starting-tracks, so that a standing train is menaced not by the train immediately following, but by the second following train, and gauntleted tracks are shown for separating the two systems of cars without switches. In another application provision is also made for operating cars on such a system by cable.

Applications Serial Nos. 276,388 and 280,665 show modifications of the general system in which trains moving in the same direction are separated at the incoming station to independent station-tracks, from which they are pulled to the rear on tail switching-tracks and pushed out on outgoing tracks. A necessary consequence of this arrangement is that the trains from the incoming station-track farthest from

the outgoing tracks in reaching such outgoing tracks necessarily cross the intermediate track leading to the rear from the other incoming station-track. The time-interval required to make the crossing safe limits the capacity of the double starting-point system when ordinary rear switching-tracks are used, which difficulty is obviated by substituting a rear curve for rear switching-tracks, as shown in applications Serial Nos. 276,388 and 276,823.

This invention has for its object to provide an arrangement of rear switching-tracks by means of which trains coming from either of multiple incoming station-tracks do not at any point cross the line of trains coming from another, thereby securing greater immunity from accident and providing an arrangement of switching-tracks better adapted for connection with others in a storage-yard than if the trains were transferred upon a curve at the rear. This is accomplished for double incoming and outgoing station-tracks by connecting the inner incoming and the inner outgoing multiple station-tracks by a rear switch or switch-back, the three practically forming a Y, and by connecting the outer incoming and outer outgoing multiple station-tracks by extending the same alongside and to the rear of the rear switching-track first mentioned, and there connecting such extended tracks by a rear switching-track, forming another Y farther to the rear than the first. Other incoming and outgoing multiple tracks are to be connected by extensions and Y's at the rear of the inner ones on the same principle, though two will be ordinarily sufficient.

In the drawings, Figure 1 represents a plan view of the tracks and platforms of a terminal station. Fig. 2 represents a diagram elevation showing relative positions of the street, tracks, and platforms; and Fig. 3 is a cross-section of the road-bed on main line, showing gauntleted tracks and position of cables for same.

A represents the incoming main track; D, the outgoing main track; B and C, multiple station-tracks for incoming passengers; E and F, multiple station-tracks for outgoing passengers; K, platform for incoming passengers; J, platform for outgoing passengers; P P P², the staircases, and H V I L rear switch-

ing-tracks, the arrangement and purposes of which, as well as of the various tracks and switches shown in dotted lines, will be understood from the description of the operation in connection with the drawings.

In operating the system trains approaching on incoming track A will be separated by switches or gauntleted tracks and directed on the tracks shown alternately to the station-tracks B and C and the passengers discharged to platform K. As a train approaches the platform on the outer incoming track B, a train which had previously entered on the inner incoming track C would be hauled to the rear, preferably by a locomotive, over necessary curves onto a rear switching-track V and pushed out, (technically "switched back") over connecting curve onto the outgoing station-track E, where passengers would be received from platform J. Meanwhile, as another train entered on incoming station-track C, the train on track B would be pulled to the rear on a straight or curved extension I thereof and over necessary connecting curves onto a rear or switching-track or "switch-back" L, at or practically at the rear of switching-track or switch-back V and of greater length than the train, when the train would be immediately pushed out onto a return-track H, preferably alongside the rear switching-track V and over necessary connecting curves onto the outgoing station-track F, whereupon the train on track E would be dispatched, preferably by gripping a cable x' directly underneath it. As another train came upon station-track E, the train on station-track F would be pushed out (preferably by the locomotive which had moved it over the rear switching-tracks) onto the main return-track D and there pick up the cable, when the locomotives would be detached and return to the rear, which can be done by crossing over at T to the incoming tracks and following along between the trains on the station-tracks B and C. The arrangement shown for the main incoming and outgoing tracks A and D is that of "double single" or "gauntleted" tracks, separating on incoming side A to the two incoming station-tracks and formed on the outgoing side by the running together of the two outgoing station-tracks. The crossing T is to be arranged with switches, so that the locomotives in returning on either of the gauntleted tracks on outgoing main line D can be directed to either of the incoming gauntleted tracks on incoming main line A. Evidently a single track may be used on the incoming main line A and outgoing main line D by providing a switch at r to separate the trains to the two incoming station-tracks and at w to bring the trains together on the outgoing main track. The rear switching-tracks may, if desired, be laid on a curve and changed in direction as shown in dotted lines at $I' V'$ H' L', or run in any convenient direction, so long as the feature described is maintained, that the Y formed by rear switching-track V

with connecting-curves, incoming track C, and outgoing track E, is inclosed within a Y or a curve represented by dotted lines U, connecting the incoming track B and outgoing track F entirely outside the rear switching-track V, so that such tracks B and F are connected together by tracks which can be operated without crossing the rear switching-track V.

When, as shown in application Serial No. 276,388, multiple station-tracks are provided only on one side of the station—the incoming side, for instance—the tracks on the other side of the station would be run together near its rear. For instance, if only the multiple tracks B and C are provided and passengers loaded and unloaded to the intermediate platform K (or platforms provided outside of B and C in addition to K for loading or unloading) the return-track H would directly connect with the return-track E on the line shown by dotted lines O, the rails being kept separate by gauntleting or uniting to form a single track, as desired. The system of rear switching-tracks arranged to form included or nested Y's is well adapted for use in a terminal station where the yard in which the extra cars are stored is on either side of such rear switching-tracks, and the tracks may readily be arranged in the yard, so that the trains can be taken in and put out of circulation in the direction the trains thereon are regularly moving. The two extensions I and H of tracks B and F will enable extra trains to be kept thereon, each moving forward a step as one moves out. Extra trains from a yard on the incoming side would naturally enter over a track Q at the proper time and be run directly on rear switching-track L and be pushed out on H. Those coming in from the yard on the outgoing side of the station would naturally be pushed in over track S directly on the outgoing track F, other trains being safely detained in the spare space left on the tracks H and I. Trains leaving the station would for similar reasons go directly off station-track B onto a track M, or off on W on the other side. A direct connection N between station-track C and the rear extension I can also be used to change cars from one system to the other, which, by means of a branch at X, can be readily got out of circulation, or, preferably, run around to be taken out at W. A direct connection O between outgoing station-track E and extension H may also be used to enable trains to be put in circulation on the inner from the outer system. A connection R from the rear of switching-track V to form a connection with switching-track L will also be convenient for the purpose last named and other interchanges that may be desirable. Rear switching-track L may also be extended into the yard and used for the purpose of putting in or taking trains out of the circulation.

It is preferred to use a cable system in which the grips are located on the cars above the rails, so that no part will project below

the latter to interfere with running such cars over ordinary switches and in trains with other cars of ordinary railroads. With such grips the cars cannot be run on ordinary curves when attached to the cable, as the latter will not, on account of its tension, drop below the rails sufficiently to engage with certainty the lateral diverting sheaves. The cables, therefore, for such a system will only be run on the tangents. It is preferred that the tracks to the multiple station-tracks be gauntleted on the main line—that is, that double rails be provided each side, as shown in Fig. 3, the outer one on one side and the inner one on the other, forming separate tracks $g g'$ and $h h'$, which at the station separate to the two starting-tracks, it being understood that more than two can be arranged on the same principle. On the center line of each of the gauntleted tracks it is proposed to arrange a cable on suitable supporting-sheaves—for instance, a cable x for rails $g g'$ and a cable y for rails $h h'$. In the arrangement shown a cable y' can be run on the incoming main track A in line with the center of station-track C and along such station-track and be carried below, where such track is curved to connect with rear switches. The cable for the station-track on turn-out B would, however, stop on the main line before reaching the curve at r , and be carried below the track to the head of turn-out B, as shown in another application, or across to form a return-cable on the other side. When the outgoing station-track E is in line with main line D, the cable, as shown at x' , would be brought up to the surface on the same near the curve connecting to rear switches and be carried along the center of such track out in proper position on the gauntleted tracks of the main outgoing line D. The cable for cars coming from the station-track or turn-out F off the line of the main line would, however, be brought up at or near w on outgoing line D, and pick-ups be there provided, so that cars pushed out from the turn-out F would pick up the cable and proceed thereby. The pick-ups may be of any form adapted for the purpose.

The station-platforms are always to be kept off the grade of the railroad-tracks. They are shown connected with the street when below the level of the rails by staircases $P P^2$, and when the street is above the rails, as shown by dotted line d , by staircases $P' P^3$, c being in both cases the level of the platform.

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

1. In combination with multiple station-tracks for trains moving in both directions, a series of rear switching-tracks, with the Y's formed by the connection of incoming and outgoing station-tracks through such rear switching-tracks, included one within the other, thereby keeping the track-connections to the separate systems of starting-

tracks independent one of another when in regular operation and avoiding crossings, substantially as described.

2. In combination with an incoming or outgoing main line and multiple station-tracks operated in connection therewith, a series of nested or included Y switching-tracks, connecting the multiple station-tracks directly or through other multiple station-tracks with the main track on the other side, substantially as and for the purposes described.

3. In combination with an incoming and an outgoing main line, multiple station-tracks operated in connection therewith, and a Y switching-track connecting one of the multiple station-tracks on one side with the main track on the other, a second switching-track circuiting around the first and connecting another of the multiple station-tracks of one side with the main track on the other side, substantially as described.

4. In combination with an incoming and outgoing main line, multiple station-tracks operated in connection therewith, and rear switching-tracks formed of switch-backs or curves to transfer the trains from the incoming to the outgoing track or tracks, a crossing T, connecting the incoming and outgoing main tracks, arranged and operating substantially as and for the purposes specified.

5. In combination with an incoming and an outgoing main line and multiple station-tracks operated in connection therewith, and a Y switching-track connecting one of the station-tracks with the main line on the other side, and a rear switching-track circuiting around the first and connecting the other station-track by curves or switch-backs with the main line on the other side, one or more track-spurs S M Q W, connected with such outer line and arranged and connected so that trains may be put in and out of circulation in the direction of regular movement, substantially as and for the purposes specified.

6. The connecting-track N, in combination with multiple station-tracks B and C, the incoming main line A, the return main line D, the Y switching-track V, and a rear switching-track connecting station-track B, directly or indirectly, with outgoing main track D, by a route entirely around and capable of being operated independently of the rear switching-track V.

7. The connecting-track O, in combination with multiple station-tracks E and F, the incoming main line A, the Y switching-track V, and the rear switching-track with branches H and I, connecting station-track F, directly or indirectly, with incoming main line A by a route entirely around and capable of being operated independently of the rear switching-track V.

CHAS. E. EMERY.

Witnesses:

ROBT. M. REEVS,
GEORGE C. PENNELL.