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R. N. R. PHELPS.
SUBWAY RAILWAY CONSTRUCTION.
APPLICATION FILED APR. 24, 1906.

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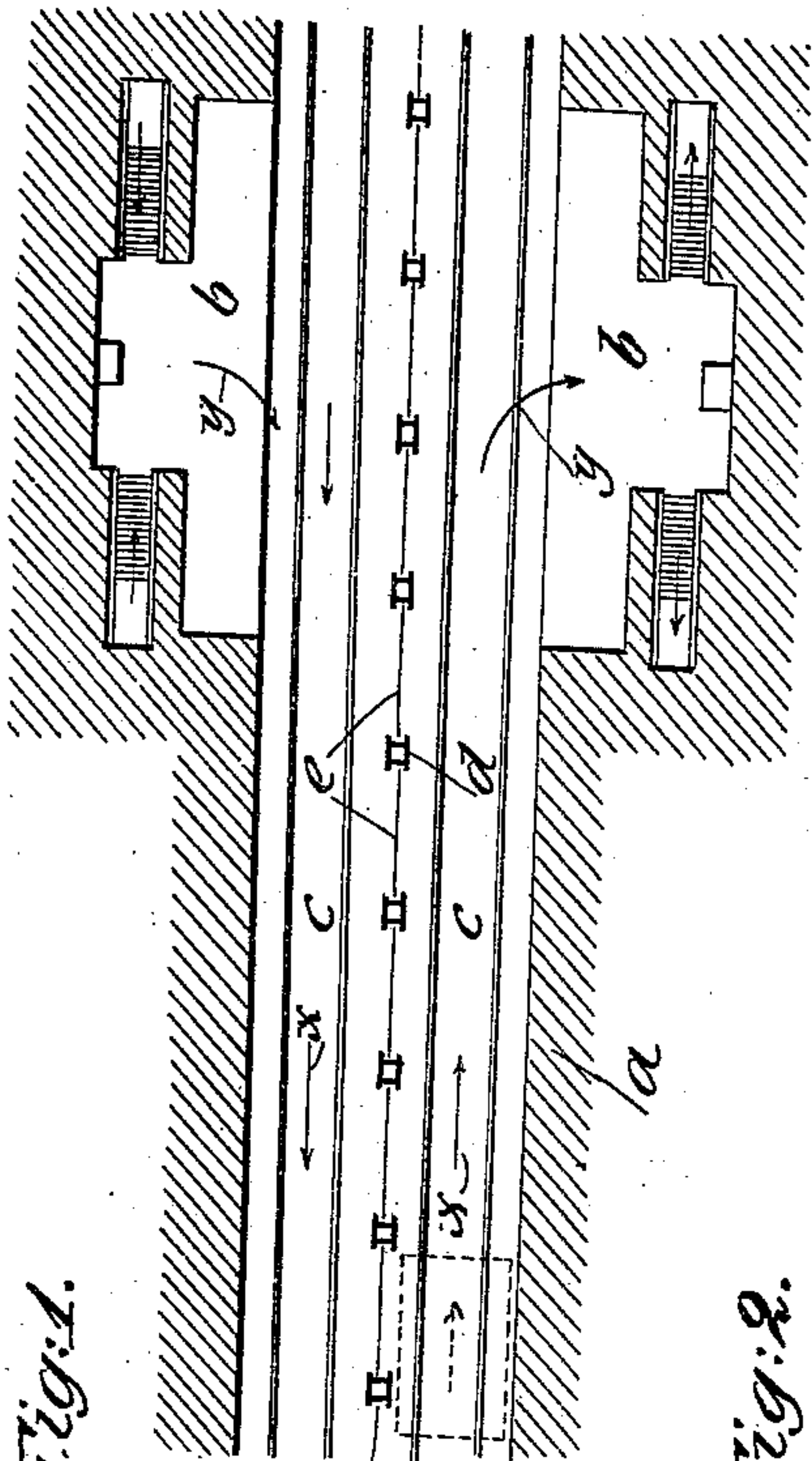


Fig. 1.

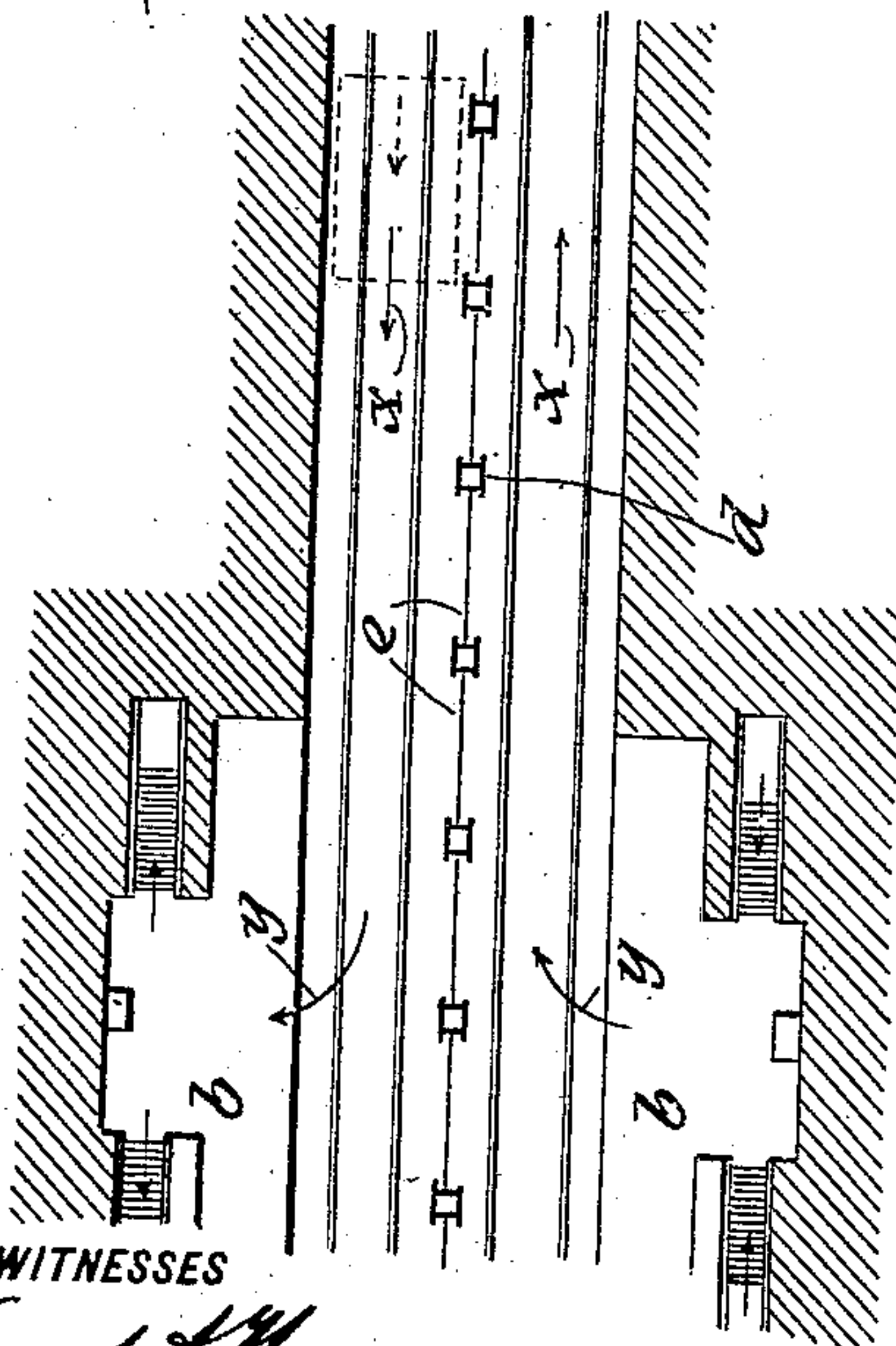


Fig. 2.

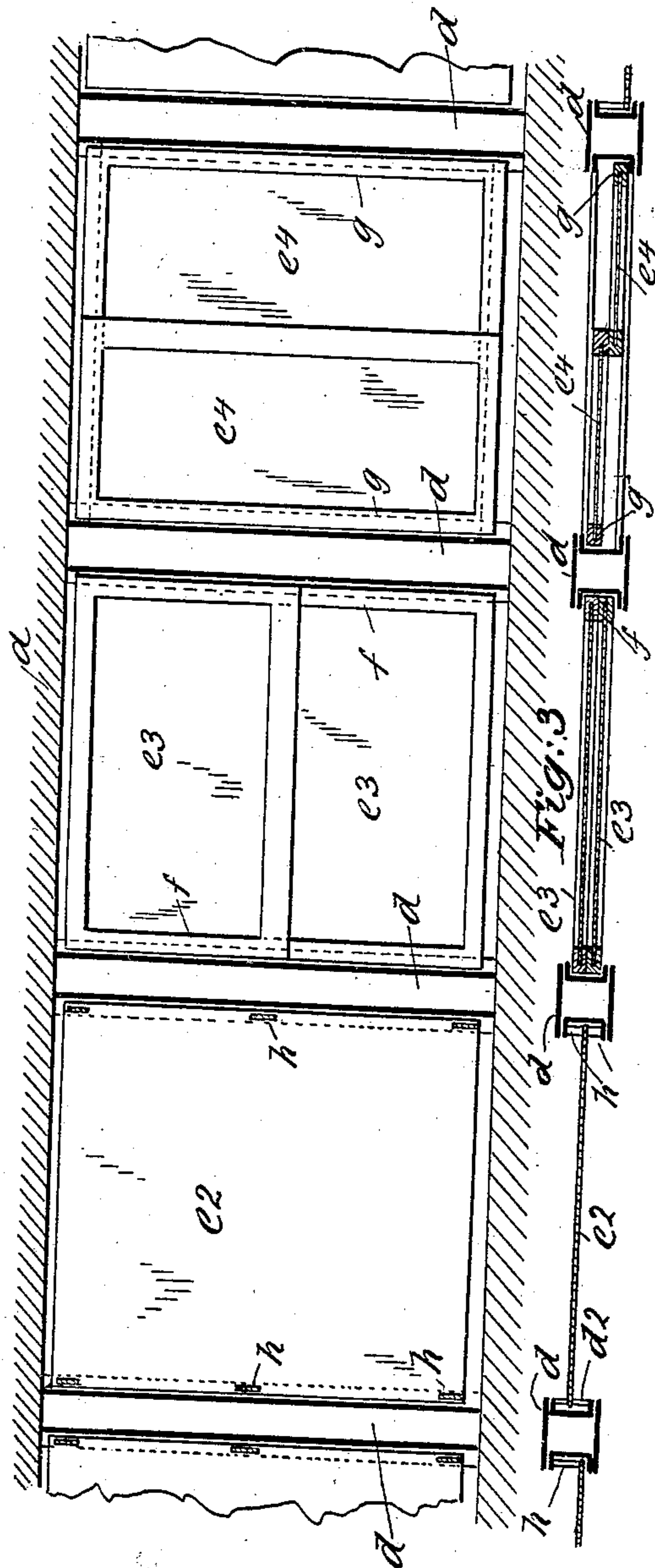


Fig. 3.

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SUBWAY-RAILWAY CONSTRUCTION.

No. 917,653.

Specification of Letters Patent.

Patented April 6, 1909.

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To all whom it may concern:

Be it known that I, RICHARD N. R. PHELPS, a citizen of the United States, and residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Subway-Railway Construction, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to subway railway construction and particularly to the ventilation of railways of this class.

It is customary in constructing subway railways to provide a tunnel or subway having separate parallel tracks, and it is also customary to provide a central row of columns which support the roof of the tunnel or subway. The roof construction of the tunnel or subway is usually composed of steel bars or other framework of steel, and this construction is, in turn, supported by rows of side columns or posts and the central row of columns or posts arranged between the separate tracks. In the construction of subway railways in this manner, it has been found very difficult and practically impossible to ventilate the same properly without the employment of escape flues which communicate with the tunnel or subway at intervals between the stations, and the passage of trains in opposite directions through the tunnel or subway does not to any material extent aid in ventilating the same for the reason that said trains churn and stir the air without creating a draft from one station to the other.

The object of my invention is to avoid these difficulties in the ventilation of subway railways by forming in connection with the central row of columns or posts arranged between the tracks, a complete partition which separates said tracks and divides the subway or tunnel into two separate compartments, whereby the passage of the trains through the separate parts of the tunnel or subway will force the air from one station to another and thus cause a strong draft through the separate parts or divisions of the subway or tunnel.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are design-

ated by suitable reference characters in each of the views, and in which:—

Figure 1 is a sectional plan view of a section of a subway railway and showing two of the entrance and exit stations and involving my invention; Fig. 2 a sectional side view showing the central division wall or partition made according to my invention; and Fig. 3 a sectional plan view of the construction as shown in Fig. 2.

In the drawing forming part of this specification, reference being made to Fig. 1, I have shown at *a* a subway railway and at *b* two entrance and exit stations. The subway railway is provided with two parallel tracks *c* and with a central row of columns or posts *d* arranged between the separate pairs of tracks *c*, and which, in practice serve to support the roof of the tunnel or subway. The columns or posts *d* are of the well known channel bar and plate construction, whereby the opposite side portions of said columns or posts are provided with vertical grooves, recesses or channels *d*², and in Fig. 1 of the drawing, I have indicated the spaces between the columns or posts *d* as filled in with panels *e*, which constitute in connection with the columns or posts *d*, a complete brattice or partition which divides the subway or tunnel into two separate compartments, each of which contains one of the tracks *c*. The brattice or panel members *e* may be composed of a separate sheet *e*² of metal, compressed wood fiber, or any other suitable material capable of being sprung into position between the columns or posts *d* as shown at the left hand side of Figs. 2 and 3, or said panels or brattice members may be divided horizontally into two separate parts *e*³ as shown at the middle of Figs. 2 and 3, or said panels or brattice members may be divided vertically into two separate vertically arranged parts *e*⁴ as shown at the right hand end of Figs. 2 and 3. Where the panels or brattice members are divided horizontally into separate parts *e*³, the said parts are preferably mounted in frames *f* similar to sash frames, and the bottom part may be raised or the top part lowered when desired, or if desired, and any suitable means may be provided for raising or lowering said parts and for holding them in the desired position. When the separate panels or brattice members are divided vertically or

composed of two vertically arranged parts e^1 they are also preferably placed in frames g , and these separate parts or members e^1 may be moved laterally so as to open or close the space in which they are placed, and any suitable means may be provided for accomplishing this result.

In case the separate panels or brattice members are composed of one part as shown at e^2 , I employ blocks or wedge members h for holding said panels or brattice members in proper position between the columns or posts d , and it will be understood that said columns or posts form vertically arranged frames in which the panels or brattice members are placed and it is immaterial whether said panels or brattice members be composed of one or more parts, or whether they be divided into vertically movable parts, members or sashes, or into laterally movable members or sashes as shown respectively at the middle of Figs. 2 and 3, and at the right-hand end portion of said figures.

Any suitable means may be provided for the proper adjustment of the panels or brattice members between the columns or posts d , and by means of my improvement, I provide a subway or tunnel of the class specified with a central longitudinal partition or brattice composed of vertically arranged columns or posts and intermediate panels or brattice members placed between said columns or posts and removable if desired, and by forming the panels or brattice members of separate parts or a portion of said panels or brattice members of separate parts, it will be apparent that if at any time such construction or arrangement is necessary, the separate compartments of the subway or tunnel may be thrown into communication, and this feature will be of particular advantage, in enabling workmen, track walkers, or others to pass from one part of the tunnel or subway to the other whenever it is necessary so to do.

By dividing the tunnel or subway in the manner described trains passing through the opposite parts thereof, as indicated by the arrows x , will draw air in at one station as indicated by the arrows y and force it out through the adjacent station and this, as will be understood, will fully ventilate the tunnel or subway at all times.

My invention is also particularly adapted for use in the division of, and ventilation of, subway railways already constructed, as by means thereof, a subway railway or tunnel of the class specified, and originally constructed in the manner hereinbefore described, may be provided with a complete central longitudinal partition or brattice in a few hours time and without stopping the operation of the road, except for a short period, which operation would be impossible if it was desired to build or erect a wall

through the entire length of the tunnel or subway so as to divide the same into separate compartments, and by employing loose panels which may be inserted or sprung into position between the channel posts, and some or all of which are or may be composed of separate movable parts, I provide means whereby passage-ways may be instantly formed throughout the length of the subway so as to permit a party or parties to pass from one compartment of the subway to another.

It is a well known fact that in the case of a wreck the cars are liable to, and most usually do take fire, and in an underground subway the smoke and other gases of combustion are fatal to life, but with my improvement the passengers could quickly pass from one compartment to another and the passage-ways being afterward closed the smoke and other products of combustion could not pass at once from the compartment in which the wreck occurred to the adjoining compartment.

Although I have shown and described my invention as applied for the purpose of dividing a subway railway into two separate longitudinal compartments, it will be apparent that the same may be employed for the purpose of dividing a subway railway or the tunnel of a subway railway into any desired number of longitudinal compartments.

Although a complete partition separating the separate compartments of the subway must be provided in summer-time or in very warm weather in order that the trains may be able to force air through the separate compartments from one station to another, it will be apparent that said complete partitions are not necessary in cold weather or in the winter time, and at such times by making the panels between the posts or columns of separate parts, at least one of which is movable, I provide means whereby passage ways between the separate compartments of the tunnel may be easily and conveniently formed at any and all places, and in cold weather the entire bottom portion of the partition may be open if desired, or each panel may have an opening either at the bottom or at one side thereof, and in this way I provide a partition which will serve for all the purposes of fully ventilating the subway in warm weather, and which may be made into a partial partition whenever desired in cold weather, in which event, the air in the separate parts of the subway will freely mingle. It will also be apparent that in cold weather the great draft or blast produced by the movement of the trains or cars where a continuous partition is employed is an inconvenience at the entrance and exit stations, and this may be remedied or dispensed with by opening the partition in the

manner described, so as to throw the separate parts of the subway into communication, and in this way the force of the blast produced by the moving trains, and especially at the entrance and exit stations where it is objectionable may be modified or regulated to any extent or reduced to a minimum.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is;—

1. The herein described means for ventilating a subway railway containing a plurality of tracks and provided at intervals with ingress and egress stations, the said tracks being separated by a continuous partition composed of vertical posts or columns arranged at intervals through the length of the railway and panels placed between said posts, whereby trains passing through the separate compartments formed by said partition and in opposite directions will draw air in through the successive stations as they pass the same and force air out through the same as they approach such stations, some of the said panels adjacent to said stations being constructed to permit the formation of openings of considerable area so as to form passage ways between the separate compartments and reduce the blast of air at the stations when desired.

2. The herein described means for ventilating a subway railway containing a plurality of tracks and provided at intervals with ingress and egress stations, the said tracks being separated by a continuous vertical partition composed of channel posts arranged at intervals throughout the length of the railway, and panels inserted between said posts, whereby trains passing through the separate compartments formed by said

partition and in opposite directions will draw air in through the stations as they pass the same and force air out through the stations as they approach them, some of the said panels being composed of separate parts one or more of which is movable to permit the formation of passageways between the separate compartments and enable the blast of air at the stations to be regulated.

3. The herein described means for ventilating a subway railway containing a plurality of tracks, and provided at intervals with ingress and egress stations, the tracks of the subway being separated by a continuous partition composed of vertical channel posts or columns arranged at intervals throughout the length of the subway and panels between them, whereby trains passing through the separate compartments formed by said partition will draw air in through the successive stations as they pass the same, and force air out through such stations as they approach them, the said panels being placed between said posts and engaging the channels of the same, some of said panels adjacent to said stations being composed of separate parts, one or more of which is movable to permit of the formation of passage ways between the separate compartments and enable the air blast at the stations to be regulated.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 23rd day of April 1906.

RICHARD N. R. PHELPS.

Witnesses:

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F. A. STEWART.