

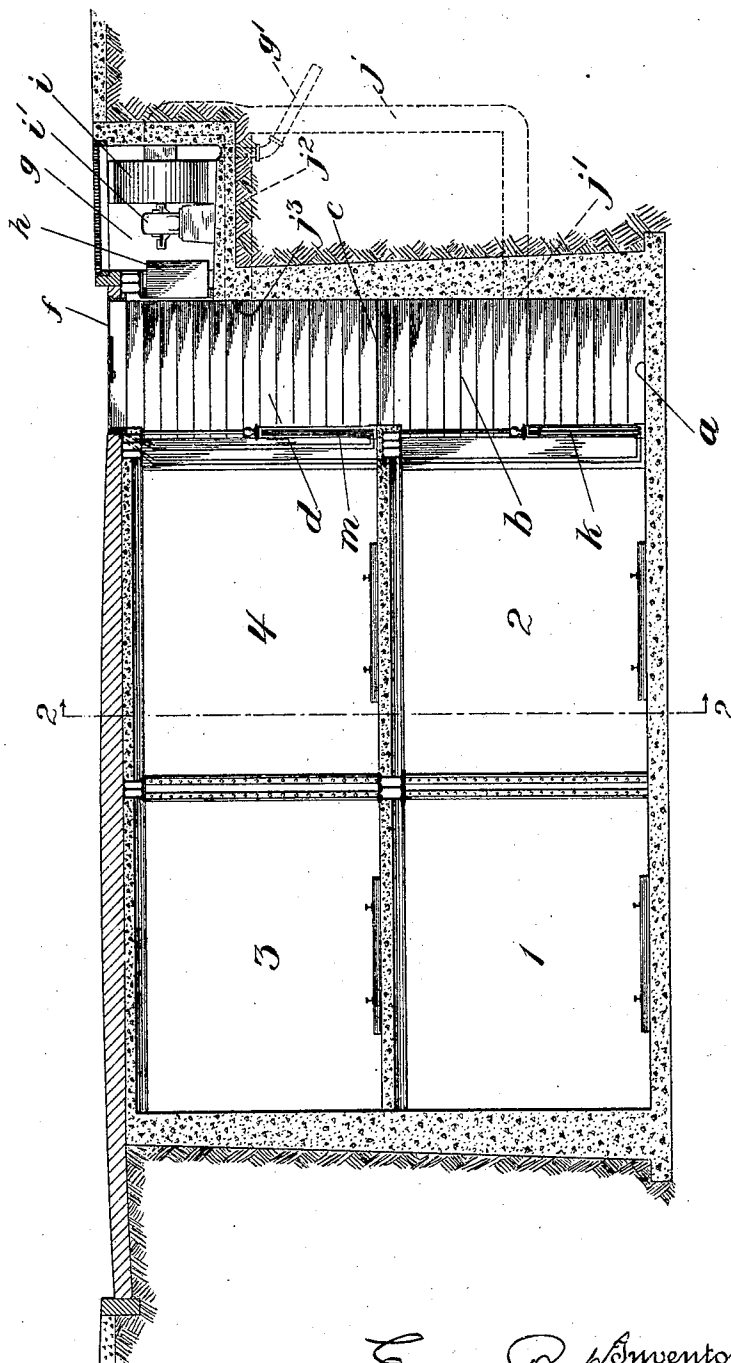
977,306.

E. B. HESS.
SUBWAY CONSTRUCTION.
APPLICATION FILED SEPT. 26, 1910.

Patented Nov. 29, 1910.

6 SHEETS—SHEET 1.

Fig. 1.



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By his Attorney
Edward C. Davidson

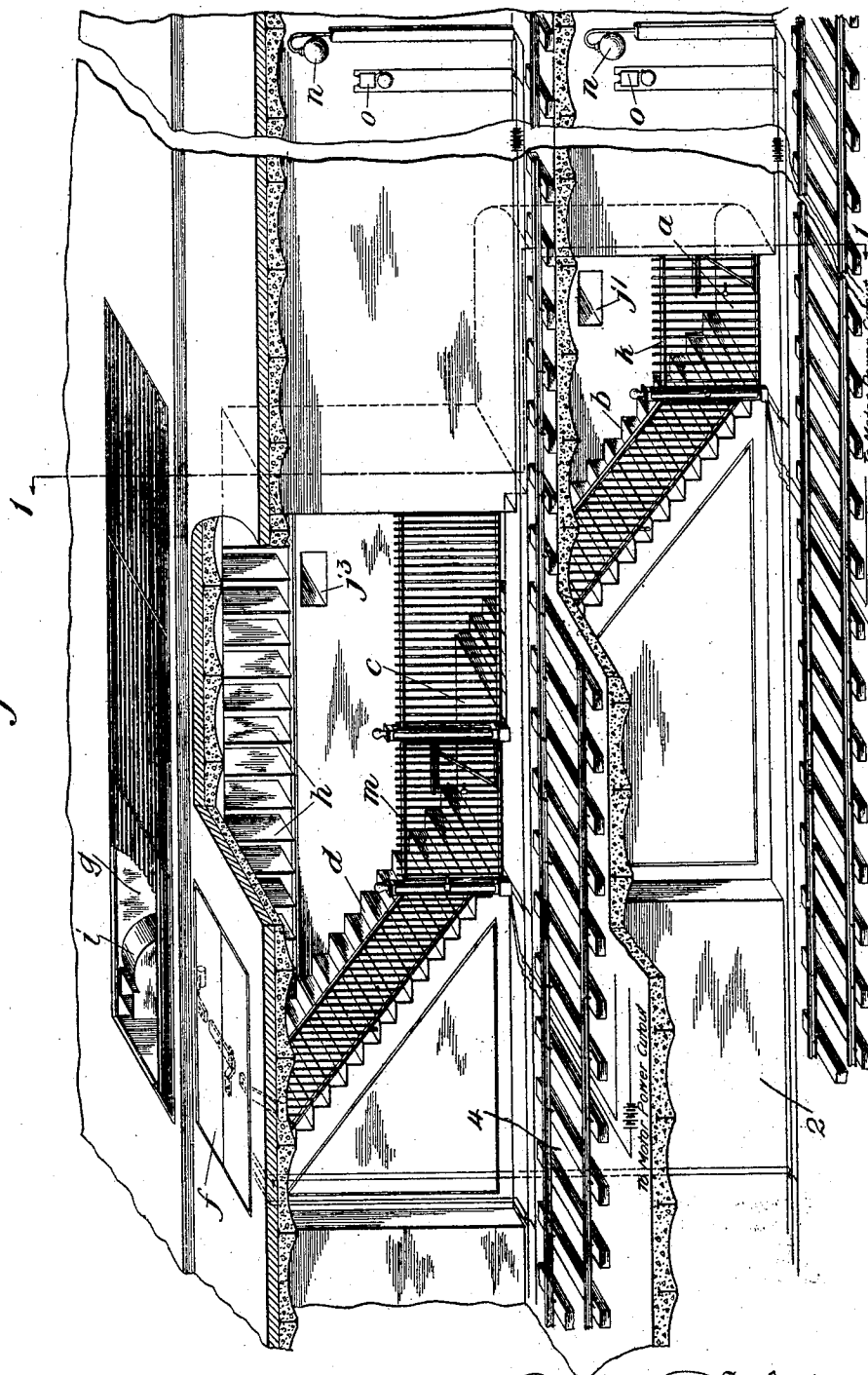
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6 SHEETS—SHEET 2.

Fig. 2.



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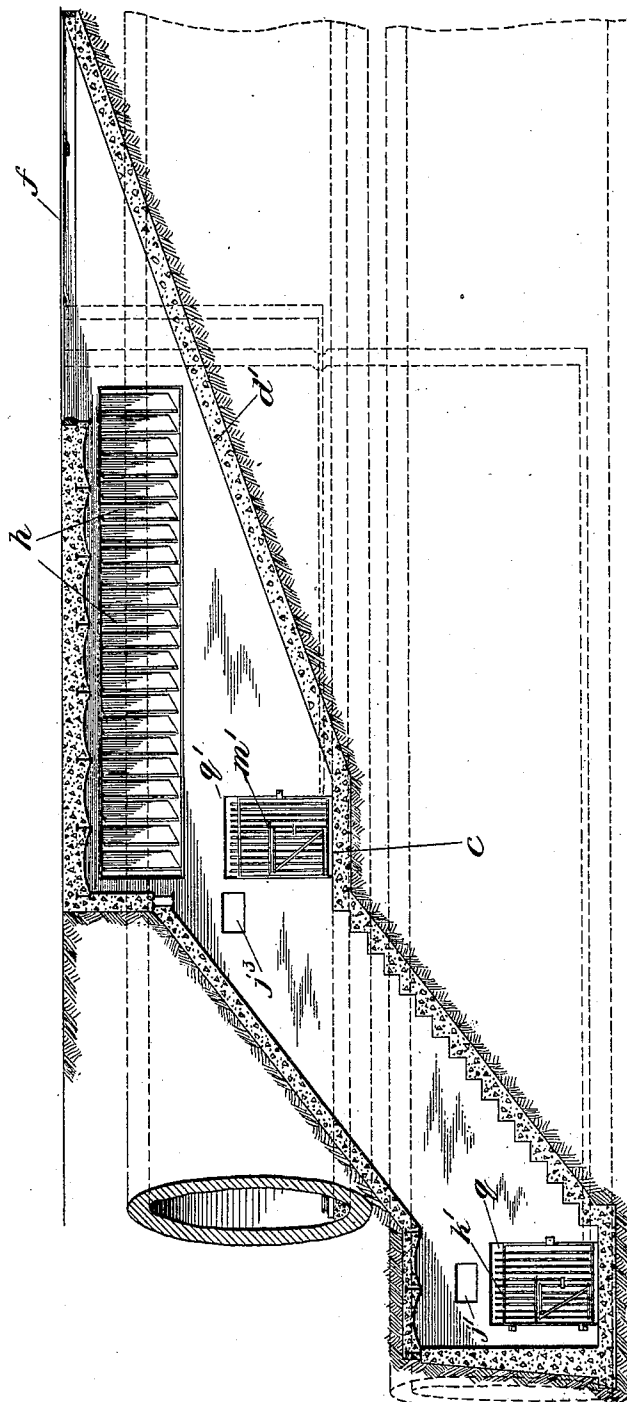
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6 SHEETS—SHEET 3.

Fig. 3.



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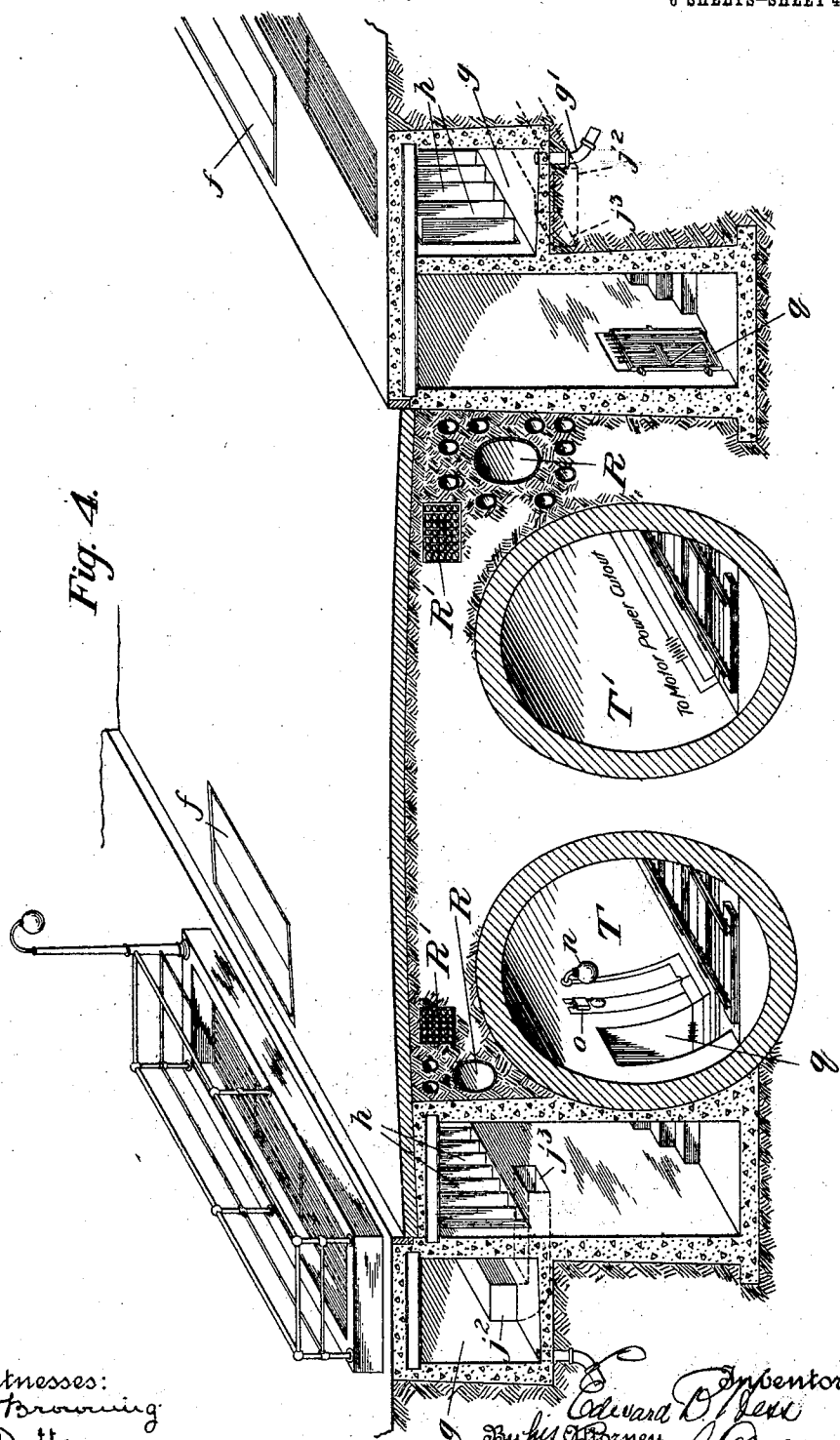
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6 SHEETS—SHEET 4.



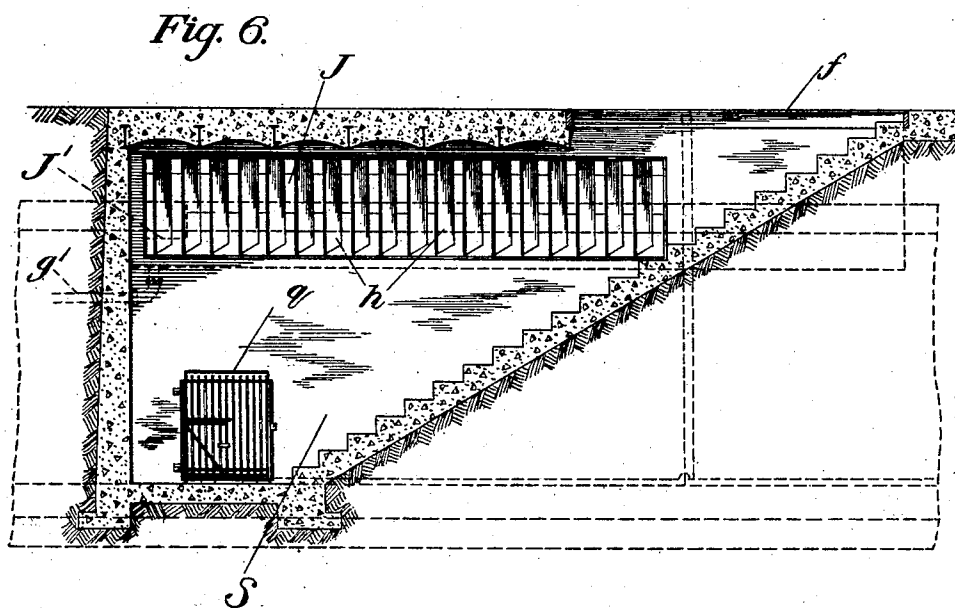
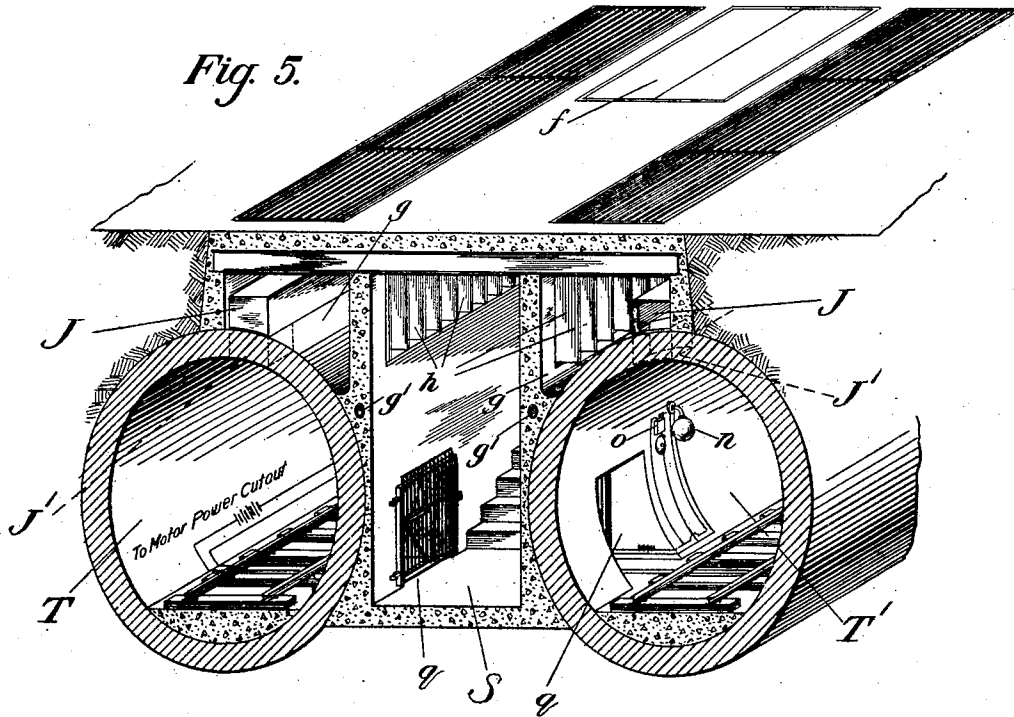
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6 SHEETS—SHEET 5.



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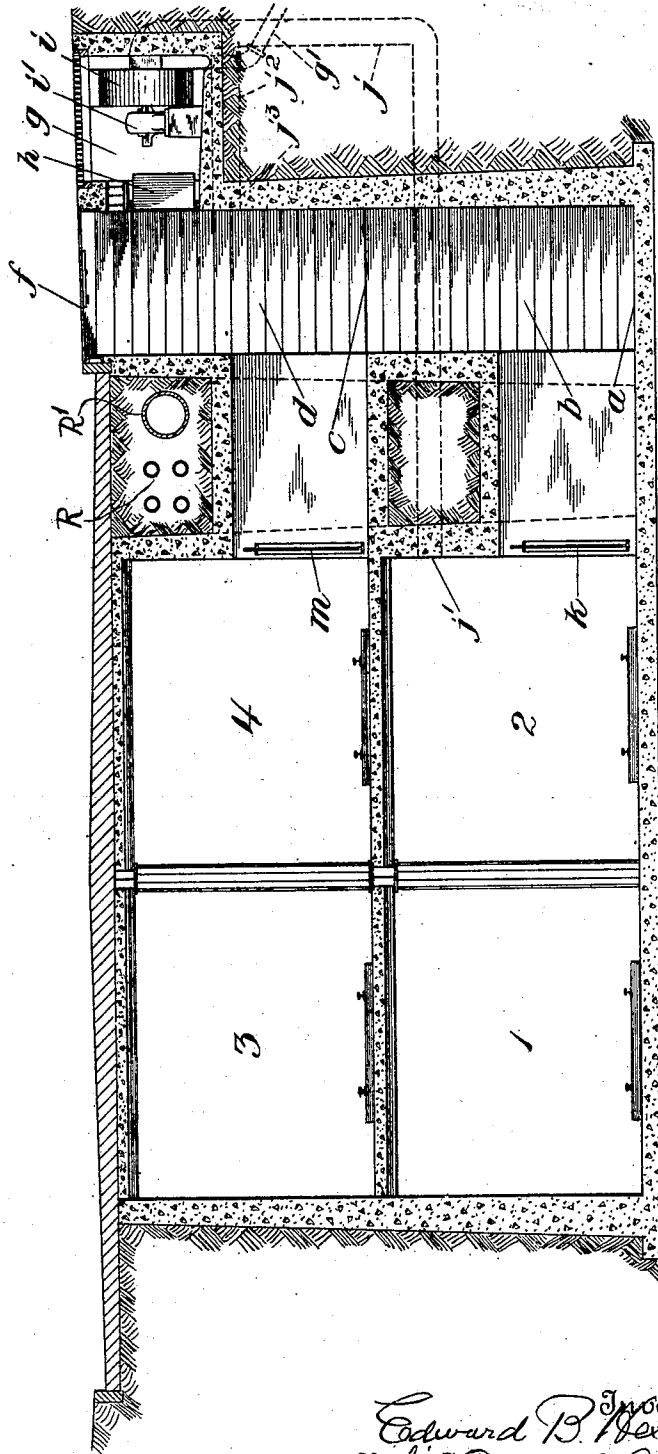
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6 SHEETS—SHEET 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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SUBWAY CONSTRUCTION.

977,306.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Application filed September 26, 1910. Serial No. 583,728.

To all whom it may concern:

Be it known that I, EDWARD B. HESS, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Subway Constructions, of which the following is a specification.

In Letters Patent of the United States, No. 962,145, granted to me June 21, 1910, I have disclosed a system of subway construction in which emergency exits are provided; also devices for throwing off power from a third rail or operating circuit; also danger and signal lights and alarms; and also provision made for lighting of the subway by daylight as well as its ventilation.

The present invention comprises certain improvements hereinafter set forth relating either to subways or track-ways rectangular in cross section or to tubular track-ways; and in either case the system is applicable to double tier track-ways either single or in which both the upper and lower tiers are each double for movement of trains in opposite directions.

The emergency exits under the construction of the present invention may be located at any distance from the track-way and be connected therewith by tunnels of sufficient cross sectional area and of indefinite length which may, of course, with respect to grade and direction be made to conform to the exigencies of the local conditions as regards the avoidance of sub-surface street obstructions such as gas and water mains, sewers, electric conduits, etc., and for the appropriate location of street level emergency gates or doors.

The general construction, as well as the details, may best be understood from the following description.

In the accompanying drawing: Figure 1 is a cross section, on the line 1, 1, of Fig. 2, of a double tier double track track-way showing an emergency exit located at one side of and communicating with the two track-ways, one above the other. A similar emergency exit may be placed on the other side of the track-way. Fig. 2, a longitudinal section therethrough on the line 2, 2, of Fig. 1: Fig. 3, a similar longitudinal section in which track-ways are indicated as tubes: Fig. 4, a cross sectional perspective view showing a single tier track-way of two tubes with an emergency exit located at the outer

side of each tube: Fig. 5, a similar view showing an emergency exit located between the tubes and common to both of them: Fig. 6, a longitudinal section through the emergency exit at the right hand side of Fig. 4: and Fig. 7, a view similar to Fig. 1, the emergency exit, however, being located at a distance from the track-way and connected therewith by a tunnel.

Referring particularly to Figs. 1, 2 and 7, the track-ways or ducts, 1, 2, 3, 4, are rectangular in cross section; and 3 and 4 are disposed respectively above 1 and 2 forming two tiers each with two tracks for trains moving in opposite directions. One tier may carry locals and the other expresses. At or about the track level of each tier there is a lateral emergency tunnel. That, from the lower duct, communicates with a flat landing *a*, at the bottom of a flight of stairs *b* that terminates above in a second flat landing *c* leading to which is a tunnel from the upper track-way 4 and from which extends a continuation *d* of the stairway to an opening at or about the street level and normally closed by doors *f*. From the upper part of the exit occupied by the stairway *b*, *d*, there extends laterally an offset chamber *g*.

As indicated in Figs. 1 and 2, the doors *f* are located in the road-way adjacent the curb line while the offset chamber *g* is located under the side-walk adjacent the curb line. The opening between the stairway exit and the offset *g* is fitted with vertical pivoted shutters or blades *h* that may be opened and closed simultaneously by a single controlling device, as an appropriately arranged endwise movable shutter shift rod. The top of the offset *g* opening within the curb line is provided with an ordinary iron grating for admission of light and for ventilation. The offset *g* has a drain pipe *g'* and in it is located an exhaust fan *i* shown as directly driven by an electric motor *i'*. The air box of the exhaust fan *i* is connected to a duct *j*, shown in full and dotted lines in Fig. 1, opening at *j'* into the lower part of the staircase well or exit. A branch of this air duct *j*², shown by dotted lines in Fig. 1, opens into the upper part of the staircase well at *j*³.

The tunnels, Fig. 7, leading from the track-ways or ducts 2, 4, to the staircase well,—that is, to the landings *a*, *c*, thereof,—are normally closed by doors or gates *k*, *m*. In case of the opening of either of these

gates for emergency exit the motive power, if the system be operated electrically, is cut off from the section of the track including this emergency exit. At the same time, the
 5 visual signal *n* and the audible signal *o* are set into operation. These signals may also be controlled at the doors or closure *f*. Of course, these signals may be appropriately disposed at any desired points. A
 10 motor power cut-out battery, and wiring connecting it to the gates *k* and *m*, and a signal battery, and wiring connecting it with the gate *k* or *m*, and a closure *f* are shown. The illustration of the power cut-
 15 out and signal devices is merely diagrammatic. The desired results may be effected electrically (as indicated) or otherwise.

The exhaust fan *i* may be, as stated, operated by an electric motor *i'* that may be
 20 automatically started into operation when the emergency exit is in use by opening the gate *k*, or *m*, or the emergency exit closure *f*, or indeed, the fan may be operated continuously for either the introduction of air
 25 or its exhaustion from the track-ways or duct.

My prior patent shows similar signal devices and their circuit and a similar motor power cut-out circuit and therefore specific
 30 description thereof seems unnecessary to a full understanding of the present invention.

Of course, the emergency exit well in which the stairway *b*, *d*, is located may be
 35 provided with any suitable means for ascent of passengers. Such means may be an inclined plane or an escalator: or the final exit may be the basement or cellar of an adjacent or remote building connected with
 40 the track-way or track-ways by tunnels of appropriate length and convenient disposition and direction.

Fig. 3 shows an arrangement similar to Fig. 2. The two track-ways, one superposed upon the other, are of the tube type and are
 45 provided with tunnels leading to the staircase well and closed normally by gates *k'*, *m'*. In this figure, however, instead of a stairway extending from the landing *c* there is shown an inclined way *d'* leading to the
 50 exit closure *f*. In other respects, the construction is, or may be, the same as that described in connection with Figs. 1 and 2. In Fig. 3, the gate-closed tunnels *q*, *q'* leading from the respective tubes to the emer-
 55 gency exit will be understood more clearly by reference to Fig. 4 which, however, shows but a single tier double tube subway. It will be plain, however, how the passageway *q* extends from the tube at or about the track
 60 level to the emergency exit. In Fig. 4 there is shown an emergency exit at each side of the double tube subway. At the right hand side, the emergency exit with the closure *f* is located under the side walk adjacent the
 65 curb line and the offset lighting and venti-

lating chamber *g* is located between the closure *f* and the building line. At the left
 hand of Fig. 4, the emergency closure *f* is located in the roadway adjacent the curb
 70 line and the offset chamber *g* with the grating cover is located in the side walk adjacent the curb line. In all other respects, the construction of the emergency exit including
 the offset *g* is, or may be, the same as that described in connection with Figs. 1 and 2,
 75 or Fig. 3. At R in the angular space between the roadway level and the inner upright wall of the emergency exit are indicated gas and water mains and R' indicates
 an electric conduit. The tubes or track-
 80 ways in Fig. 4, marked T and T', are, or may be, provided with motor power cut-out devices and track signaling devices controlled electrically or otherwise by opening
 and closing of the gates that close the tun-
 85 nels leading from the tube to the emergency exit. It will be apparent that the tunnels *q* may be of indefinite length and that the actual emergency exit may be of any character and may be even the basement or cellar
 90 of a remote or distant building. The tunnel opening from the tube is not such as to impair the integrity or strength of the tube and, of course, the tube at this point may,
 if desired or required, be reinforced in any
 95 appropriate way.

In Fig. 5, the tubes T, T' are placed at such distances apart as to provide space between them for an emergency exit provided
 100 with a stairway leading to the exit closure *f* that may be located in the roadway and on the side of which are the light admitting ventilating chambers *g*. The arrangement of the tunnel from each tube to the centrally
 105 disposed emergency exit and of the gate closing or obstructing the tunnel is or may be the same as indicated in Fig. 4.

In Fig. 5, the air exhaust duct J is to communicate with an exhaust fan such as *i*
 (Fig. 1) or any appropriate device of that
 110 character directly electrically driven or otherwise. In the construction of Fig. 5, this duct opens to the top of the track-way or tube, the openings therein being marked
 115 J', J', so that air may be introduced into the tubes or withdrawn therefrom for the purposes of ventilation, or in the event of foul atmosphere in the tube due to combustion, as in the case of fire or burning out of
 120 insulation, etc., the smoke or contaminated air may be withdrawn. It is thought sufficient to show the air duct J, and that illustration in Fig. 5 of the blower or exhaust
 devices is unnecessary since they may be of
 125 any appropriate character and are or may be substantially such as indicated at *i* in Fig. 1. In Fig. 7 are also shown at R, R' gas and water mains.

I claim:

1. A railroad subway system comprising a 130

track-way for carrying cars, an emergency exit and an emergency tunnel leading from the track-way to the emergency exit.

2. A railroad subway system comprising
5 a track-way for carrying cars, an emergency exit, an emergency tunnel leading from the track-way to the emergency exit and a means for, under normal conditions, obstructing traffic through the tunnel between
10 the emergency exit and the track-way.

3. A railroad subway system comprising
a track-way for carrying cars, an emergency exit, an emergency tunnel leading from the track-way to the emergency exit, a means for,
15 under normal conditions, obstructing traffic through the tunnel between the emergency exit and the track-way and means for cutting off train-moving power from a contiguous section of the track-way when the
20 tunnel is in emergency use.

4. A railroad subway system comprising a track-way for carrying cars, an emergency exit, an emergency tunnel leading from the track-way to the emergency exit, a means
25 for, under normal conditions, obstructing traffic through the tunnel between the emergency exit and the track-way and means for setting into operation appropriately located signaling devices in the track-way when the
30 emergency tunnel is in emergency use.

5. A railroad subway system comprising a track-way for carrying cars, an emergency exit, an emergency tunnel leading from the track-way to the emergency exit, a means
35 for, under normal conditions, obstructing traffic through the tunnel between the emergency exit and the track-way, means for cutting off train-moving power from a contiguous section of the track-way when the
40 tunnel is in emergency use and means for setting into operation appropriately located signaling devices in the track-way when the emergency tunnel is in emergency use.

6. A railroad subway system comprising
45 two track-ways one located above the other, an emergency exit and an emergency tunnel leading from each track-way to the emergency exit.

7. A railroad subway system comprising
50 two track-ways one located above the other, an emergency exit, an emergency tunnel leading from each track-way to the emergency exit and means for, under normal conditions, obstructing traffic through each of
55 said tunnels.

8. A railroad subway system comprising two track-ways one located above the other, an emergency exit, an emergency tunnel leading from each track-way to the emer-

gency exit and means for cutting off train- 60
moving power from a contiguous section of either track-way when its emergency tunnel is in use.

9. A railroad subway system comprising
two track-ways one located above the other, 65
an emergency exit, an emergency tunnel leading from each track-way to the emergency exit, a means for, under normal conditions, obstructing traffic through each tunnel between the emergency exit and track- 70
way and means for setting into operation appropriately located signaling devices in either track-way when its emergency tunnel is in use.

10. A railroad subway system comprising 75
two track-ways one located above the other, an emergency exit, an emergency tunnel leading from each track-way to the emergency exit, a means for, under normal conditions, obstructing traffic through each tunnel between the emergency exit and track- 80
way, means for setting into operation appropriately located signaling devices in either track-way when its emergency tunnel is in use and means for cutting off train- 85
moving power from a contiguous section of either track-way when its emergency tunnel is in use.

11. A railroad subway system comprising a track-way for carrying cars, an emergency 90
exit, a stairway located therein and an emergency tunnel leading from the track-way to the emergency exit.

12. A railroad subway system comprising
two track-ways for carrying cars one located 95
above the other, an emergency exit containing a stairway and an emergency tunnel leading from each track-way to said stairway.

13. A railroad subway system comprising 100
a track-way for carrying cars, an emergency exit containing means for ascent of passengers to the street level, a tunnel leading from the track-way to the emergency exit and lighting means for the emergency exit comprising an offset at the upper part of the 105
emergency exit receiving daylight at or about the street level.

14. A railroad subway system comprising 110
two track-ways, an emergency exit and an emergency tunnel leading from each track-way to said exit.

In testimony whereof, I have hereunto subscribed my name.

EDWARD B. HESS.

Witnesses:

T. C. MYER,
G. F. HANDLEY.