

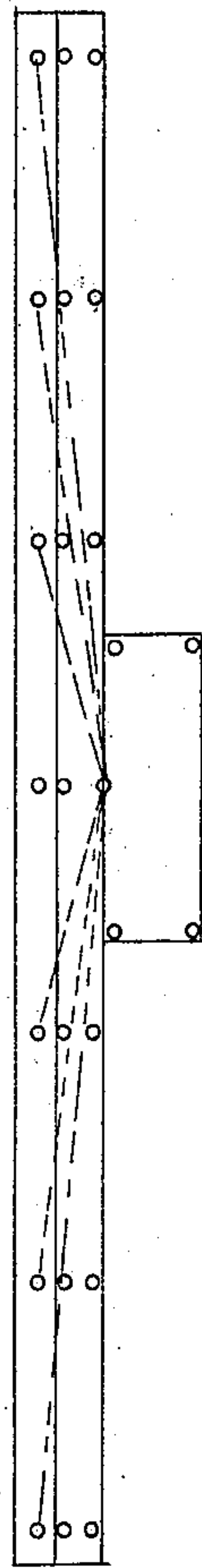
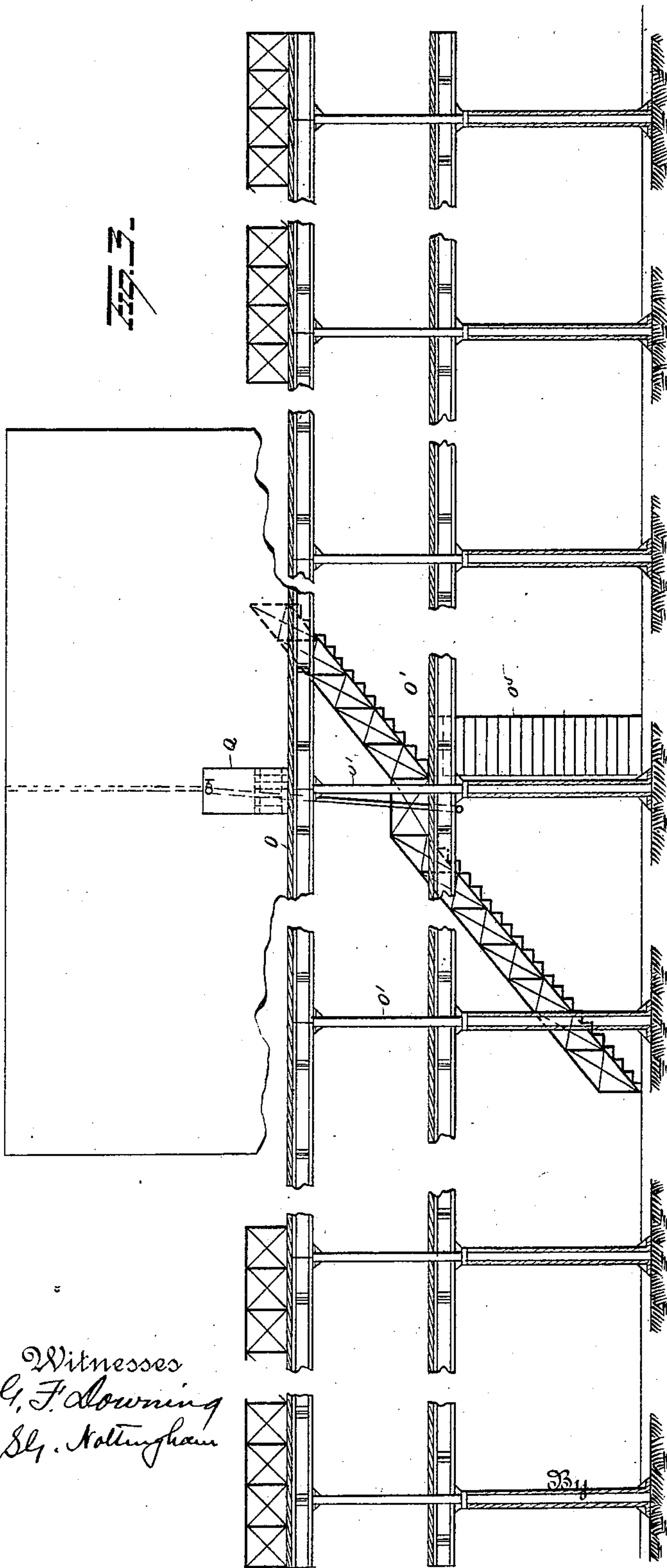
(No Model.)

3 Sheets—Sheet 2.

H. FLAD.
SYSTEM OF RAPID TRANSIT.

No. 405,306.

Patented June 18, 1889.



Witnesses
G. F. Downing
Sly. Nottingham

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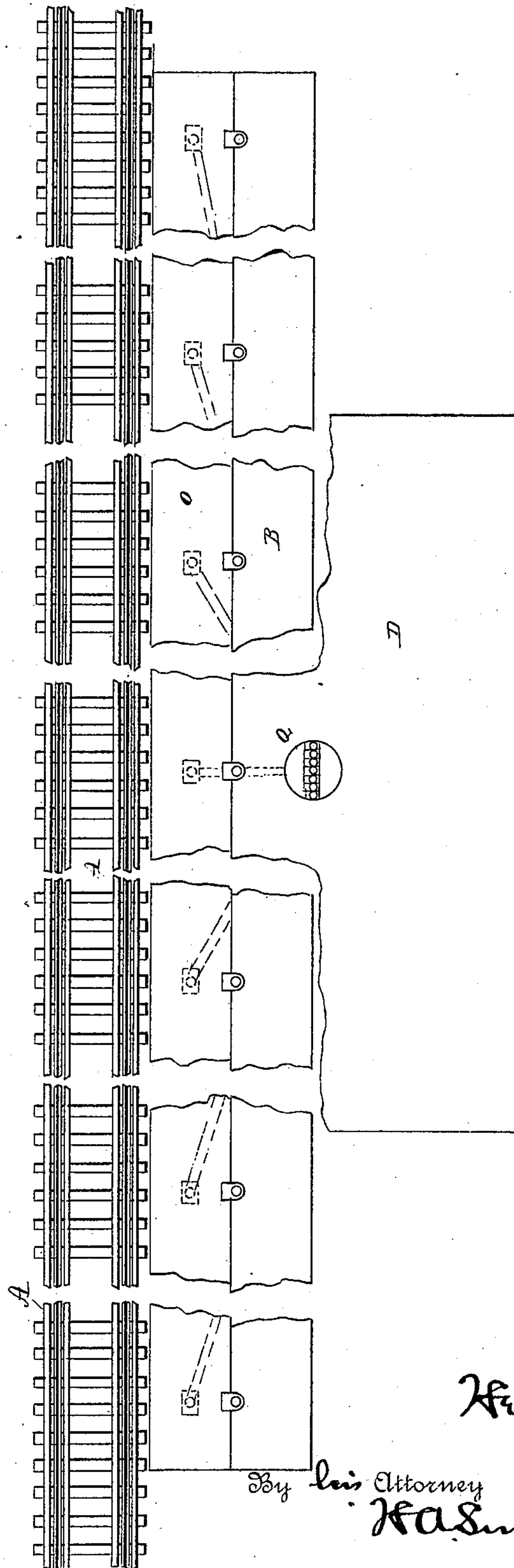
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SYSTEM OF RAPID TRANSIT.

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Witnesses
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UNITED STATES PATENT OFFICE.

HENRY FLAD, OF ST. LOUIS, MISSOURI.

SYSTEM OF RAPID TRANSIT.

SPECIFICATION forming part of Letters Patent No. 405,306, dated June 18, 1889.

Application filed June 16, 1887. Renewed November 23, 1888. Serial No. 291,713. (No model.)

To all whom it may concern:

Be it known that I, HENRY FLAD, of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Systems of Rapid Transit; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in rapid-transit systems, and more particularly to the construction of station-platforms for the convenience of passengers in entering and leaving the trains.

In an application for Letters Patent bearing the same general title as the present and filed on the same date therewith a movable platform was shown and described as actuated by compressed air from a conduit adapted to furnish a supply to storage-reservoirs carried by the train for operating the air-brakes, and also, when desired, to the motors for driving the cables.

The object of my present invention is to provide a movable platform and feasible mechanism for operating the platform, whereby the passengers leaving and entering a train at stations where there is liable to be a crowd may be rapidly and safely loaded and received without confusion.

A further object is to provide a platform of the above character which may be economically constructed and operated.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical transverse section through a station, station-platform, track, and car, showing the movable platform in position to receive passengers from the train. Fig. 2 is a similar view showing the platform in its elevated position. Fig. 3 is a view in side elevation. Fig. 4 is a plan view, partly in section, and Fig. 5 is a partial plan view on a smaller scale.

A represents the track; B, the platform at the station considered as a whole; C, the car standing on the track in front of the station; D, the station, and E a power-supply, prefer-

ably a supply of compressed air conducted along the track in a suitable conduit to be employed in furnishing power to actuate the brakes and the cables as well as the movable platforms. It is not, however, essential to my present invention that the power be confined to compressed air, as water under pressure or steam might be substituted therefor.

The upper section of the platform (designated by the letter O) is on a level with the floor of the car, and is divided longitudinally into two parts. That part *o* which lies next to the track rests on the plungers *o'* of hydraulic rams connected by iron girders *o''* with brackets *o'''* at short distances apart, to which the planks composing the platform are fastened. Another platform *O'*, of exactly the same dimensions, is carried by the same plunger about eight or ten feet below the upper platform. While no train is stopping at the station, the plungers of the hydraulic ram are at their highest positions, as shown in Fig. 1.

Eight or ten feet below that part of the upper platform next to the station-house, and which is on a level with the waiting-room, is a fixed platform *o''*, from which a stairway *o'''* leads to the sidewalk, while the waiting-room is reached by a separate stairway. The inner and outer parts of both upper and lower platforms are separated by wire screens *o''''* when no train is at the station. When a train arrives, the passengers leaving the cars get on the platform *O'*, and as soon as all who desire to get off at that station have left the cars the platform is allowed to descend until it reaches the level of the fixed platform *o''*, at which moment the platform *O* has reached the level of the fixed part of the platform *O'*. (See Fig. 2.) The two screens *o''''* are then opened, and the passengers who have just arrived pass down the stairway *o'''*, while the passengers from the waiting-room and from the platform *O* in front of it enter the cars across the upper movable platform *o*. As soon as the train has left, the platforms are returned to their elevated adjustments. A permanent screen *o'''''* on the track side prevents any liability of falling from the platform *O'* during its descent. The raising and lowering of the platforms is accomplished by hydraulic and pneumatic devices as follows:

Every hydraulic ram P is connected with a large closed cylinder Q, placed at or near the station, by a pipe p , which enters into the bottom of the cylinder. All the pipes p enter the cylinder on a straight line, and at their upper ends each is provided with a Union water-meter p' , or some similar rotary meter or pump, in which the quantity of water passing through it is directly measured. The spindles of all the meters p' are connected, so that the quantity of liquid passing from the hydraulic rams to the cylinder, or vice versa, must be the same for each one of the pipes. The closed cylinder Q is of such dimensions that it will hold the liquid used (glycerine or oil) of all the hydraulic rams in addition to the liquid required to cover the meters at the ends of the pipes p . The cylinder Q is connected with the main compressed-air conduit by a pipe p^2 , leading from a point at or near its top. In the pipe p^2 a three-way cock p^3 is placed, which, when in one position, will establish a connection between the interior of the cylinder and the atmosphere, and in another position will open communication between the interior of the cylinder and the main air-supply pipe. The pipes p are each provided with a stop-cock p^4 at points a short distance below the bottom of the cylinder Q, which are connected so as to be opened or closed together.

The diameters of the hydraulic rams P are such that the pressure of the compressed air from the main supply-pipe is a little more than sufficient to raise the combined weight of the plungers, the beams connecting the plungers, and the weights of the platforms. Before the train arrives the plungers stand at their highest positions and the stop-cocks p^4 in the connecting-pipes are closed. The three-way cock is adjusted to open communication between the cylinder Q and the main air-supply pipe. After the train has arrived and the passengers have stepped onto the movable platform O', the stop-cocks p^4 are opened, and at the same moment the three-way cock is adjusted to open communication between the cylinder and the atmosphere and close communication between the cylinder and the main air-supply pipe. The compressed air in the cylinder is now free to escape, and the platform, with its load, will descend, forcing the liquid through the meters into the cylinder. When the plungers have reached the limit of their downstroke, the compressed air will have escaped from the cylinder and the cylinder will be nearly filled with liquid.

The platform may have its load very unevenly distributed, and such distribution would naturally cause the plungers to descend with varying speeds, and thereby tilt the platform and cause the plungers to bind; but as the liquid is forced to escape through the meters, and as the meters are connected in such a manner as to require them to rotate with equal speed, the plungers are caused to descend at a uniform rate and their free move-

ment is secured. The small opening in the three-way cock through which the compressed air escapes admits of regulating the descent of the platform with a great degree of accuracy. After the train has left the station the three-way cock is adjusted to cut off communication between the cylinder and outside air and to open communication between the cylinder and the main air-supply pipe, which will return the platforms to their elevated adjustment by forcing the liquid into the rams.

By the above construction the platform may be allowed to remain at rest during portions of the day when the travel is light, and while so at rest there is no waste of power and yet it is ready to be operated at any moment. Power is used only to elevate the unloaded platform, and the management is so simple that the gate-tender or ticket-receiver can readily attend to it without additional help, and the disagreeable and often dangerous conflict of passengers pressing their way in opposite directions to and from the train is avoided.

As an auxiliary in landing and receiving the passengers, the car-doors should open along the side of the car and the seats run transversely across the car, there being one door for each two seats. This would prevent the delay which is caused by the long line of passengers crowding to the end doors to step off, would do away with the necessity of end platforms and thereby save seating-room, and would tend to distribute the load more evenly on the platform. The specific construction of the car is not, however, a part of my present invention, but is reserved as the subject-matter of a future application.

It is evident that the construction and arrangement of the several parts of the movable platform and its actuating mechanism might be varied in many respects without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the construction herein set forth; but,

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

1. In a rapid-transit system, the combination, with stationary platforms located in different horizontal planes and a track located near the upper platform, of an elevator having upper and lower platforms and located between the stationary platforms and track, substantially as set forth.

2. The combination, with fixed platforms located in different horizontal planes and a track, of an elevator located between the track and fixed platforms and provided with two platforms, the latter when the elevator is in its lowest position registering, respectively, with the fixed platforms, substantially as set forth.

3. The combination, with a fixed platform and an elevator located adjacent thereto and having two platforms, of a series of hydraulic rams located beneath the movable elevator,

a series of platform-supporting plungers adapted to slide within the rams, and means for operating the plungers, substantially as set forth.

5 4. The combination, with two fixed platforms located in different horizontal planes, a stairway to each platform, and a track, of an elevator located between the fixed platforms and track and provided with the platforms adapted when in their lowered positions to register with the fixed platforms, substantially as set forth.

15 5. The combination, with a fixed platform and an elevator having two platforms located adjacent thereto, of the series of hydraulic rams, the elevator-supporting plungers adapted to work in the rams, a pressure-cylinder, pipes leading from the rams to the pressure-cylinder, and a power-supply in connection
20 with the pressure-cylinder, substantially as set forth.

25 6. The combination, with the movable platform, the hydraulic rams, and the platform-supporting plungers, of the pressure-cylinder, the pipes leading from the rams to the pressure-cylinder, meters located at the cylinder ends of the pipes, and a power-supply in connection with the cylinder, substantially as set forth.

7. The combination, with the series of hydraulic rams, the platform-supporting plungers adapted to work in the rams, the pressure-cylinder, and the pipes leading from the several rams to the bottoms of the cylinder and terminating in a horizontal line, of a series of
30 meters located in the ends of the pipes within the cylinder and means for communicating pressure to the cylinder, substantially as set forth.

8. The combination, with the hydraulic rams and the pressure-cylinder common to the several rams, of meters located in the conduits leading from the pressure-cylinder to the rams, adapted to regulate the flow of liquid to and from the rams, and mechanism connecting the several meters, whereby
45 they are caused to operate simultaneously, for the purpose substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY FLAD.

Witnesses:

EDWARD F. FINNEY,
ARCHIE MCL. HAWKS.