

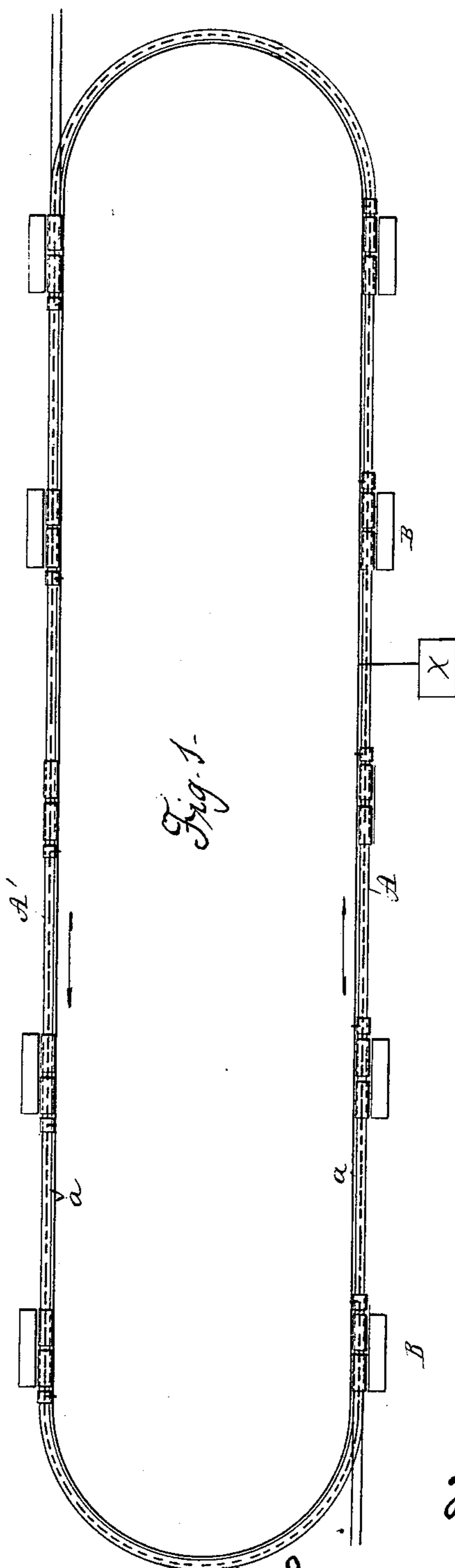
(No Model.)

2 Sheets—Sheet 1.

H. FLAD.  
SYSTEM OF RAPID TRANSIT.

No. 405,769.

Patented June 25, 1889.



Witnesses  
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Inventor  
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By his Attorney  
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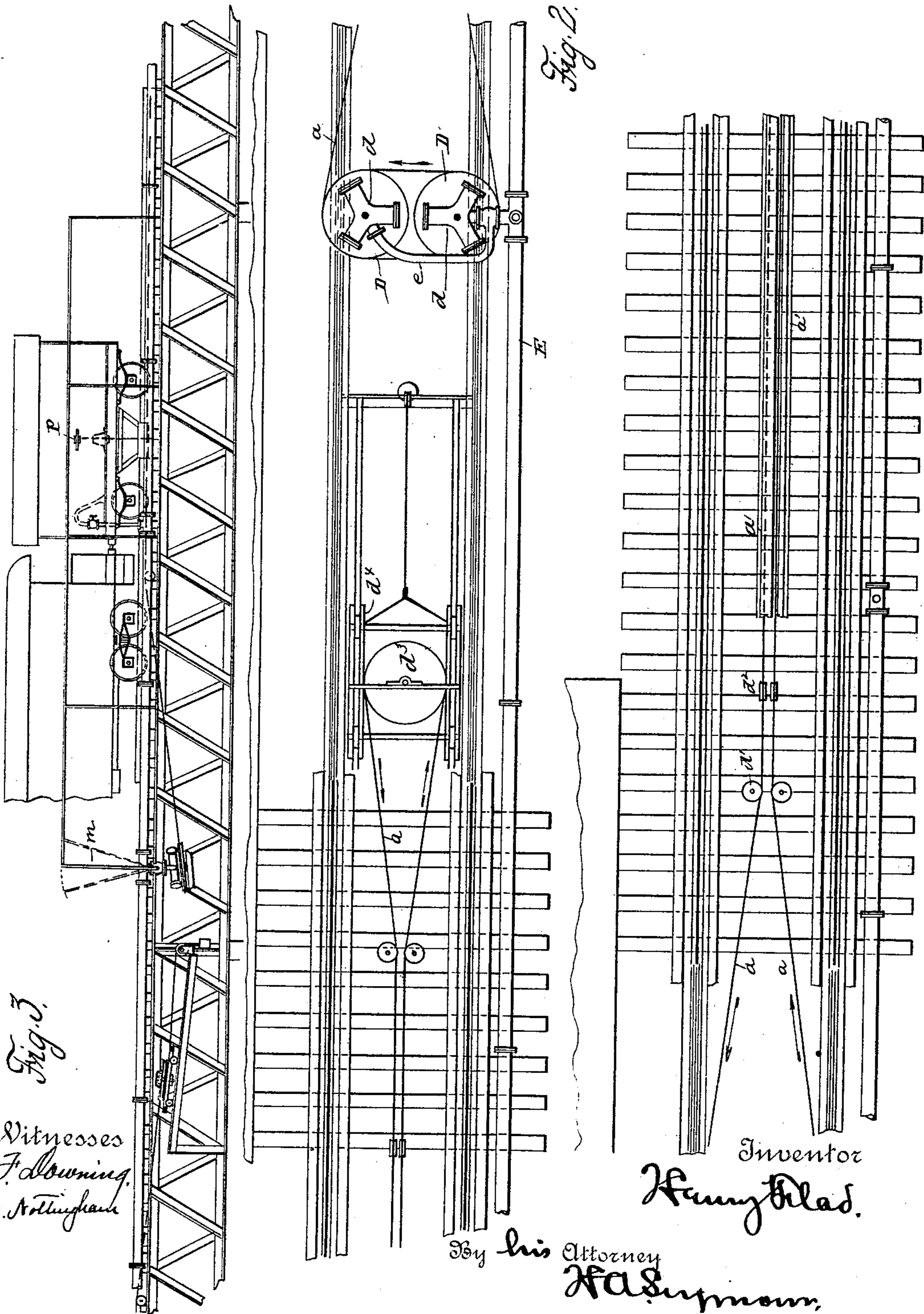
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2 Sheets—Sheet 2:

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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. 405,769, dated June 25, 1889.

Application filed June 16, 1887. Renewed May 29, 1889. Serial No. 312,545. (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.

In an application bearing the same title as the present and filed of even date herewith mechanism was shown and specifically claimed whereby several endless cables located one after another along a track served to propel trains in opposite directions along the same thoroughfare, one part of the cable serving to propel the outbound trains and the other part to propel the return trains. The general arrangement of the cables, the engines for driving the cables, and the power-supply, where the outbound track is located on one thoroughfare and the return track on another thoroughfare, was also referred to as a part of the general system.

The object of my present invention is to provide a system of transit composed of several independent cables located along a single track, with their idle and working portions passing in the same horizontal plane but in opposite directions, the idle portion of which cable is suitably supported, motors for actuating the cable, and a common power-supply.

With this end 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 plan view of the corresponding sections of two tracks located on separate thoroughfares, showing the positions of the outbound and return trains as they are about to start from their respective stations and the location of the compressed-air conduit along the track. Fig. 2 is an enlarged partial plan view showing the beginning of one cable-section and the terminal of the adjacent cable-section; and Fig. 3 is a side elevation of the section shown in Fig. 2, with the grip-car and a por-

tion of the adjacent passenger-car in position on the track.

A and A' represent, respectively, the outbound and return tracks, as indicated by the arrows, the point of starting being assumed to be at the left-hand end of the road as a person faces the drawings.

The several cables represented by *a* are each intended to reach from one station B to the next succeeding station, that the momentum of the train will carry it along from the terminal of one section to the beginning of the next succeeding station.

Each cable is driven by an engine or set of engines *d*, preferably a set of two, secured directly to the shafts of the cable-driving drums D. The engines are of the rotary type, and are each connected by a suitable branch pipe or conductor *e* with a common supply-conduit E. The cable *a*, after passing around the drums D, extends between a pair of guide-rollers *d'* and over a pair of guide-rollers *d''* to the terminal, where it passes around a pulley *d'''*, held under the proper tension by devices *d''''*, fully described in the former application above referred to or by any well known and approved tension device. That part of the cable which travels in the direction in which the train is to be propelled is located centrally along the track in a position to be grasped by the grip, while the idle part is carried along a suitable housing *a'* out of the way. This housing *a'* constitutes an important feature of my invention, and although it takes up no more space than the ordinary slot-iron, and, in fact, to all outward appearance is nothing more nor less than a slot-iron, yet it is very necessary as an element of my present invention, for the outgoing and returning cables run so close together that unless the idle one is covered there is always a liability of the moving portion being gripped. As it is, no such liability exists, and there is simply left between the slot-irons the accustomed space just wide enough to receive the grip. In the event of a breakage or injury to the cable, this housing may be removed, and it is evident from the construction that this housing could be placed over either portion of the cable according to the direction in which it is desirable for the cars to

travel, the portion running in the direction of travel always, of course, being exposed, while the idle portion is covered by the housing.

In the present instance the motive power is compressed air, although electricity might be employed, a common supply being conducted along the track, and the engines *d* being replaced by electromotors. The compressed air is conducted along the track in a conduit, a separate conduit being provided for the outbound and for the return tracks. The conduits *E* extend in opposite directions from a central supply-reservoir *X* and furnish the motive power for the several engines or sets of engines located along the track at each cable-section. The supply-reservoirs are kept charged by compressing-engines, and are located as far apart as is consistent with keeping up the requisite degree of pressure at the farthest engines. Such pressure is equalized to a great extent by the employment of receiving-tanks of great capacity, into which the air is discharged from the compressing-engines.

By the above arrangement each independent cable propels a train in one direction only.

The lever, as *m*, within the control of the train-manager for admitting the compressed air to the engines and starting the train, automatic devices for regulating and stopping the engines, the grip-car, as *p*, with its storage-reservoirs and air-brake-controlling mechanism, and the branch pipes, as *q*, for admitting the compressed air to the storage-reservoirs in the grip-car, are all similar in construction to those fully described in connection with my former application, hereinbefore referred to, and a detailed description of them is not here repeated.

The several engines are intended to be so timed that the trains will be propelled from station to station simultaneously, or practically so, and where for any reason the distance between two stations is considerably greater than between two others the trains may run at a higher speed to make up the distance, or the distance may be subdivided

and a stop made intermediate; or two or more parallel cables may be employed to accommodate the two or more different trains on the section at one time.

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

1. In a system of rapid transit, the combination, with several independent cables located along a single track and motors for actuating the cables, the idle and working portions of said cables passing in the same horizontal plane in opposite directions, the idle portion being covered with a housing, of a common power-supply located along the track and having connection with the several motors, substantially as set forth.

2. In a rapid-transit system, the combination, with several endless cables located one after another along a single track, the idle and working portion of said cables passing in opposite directions in the same horizontal plane, the idle portion being covered by a suitable housing, and independent motors for actuating the cables, of a centrally-located supply-reservoir, and power-supply conduits leading in opposite directions from the central supply-reservoir to the several motors.

3. In a rapid-transit system, the combination, with a series of independent endless cables located one after another along the track, the said cables passing over the ties of the track and provided with housings for covering the idle portion of the cables, of engines for actuating the cables, and a power-supply conduit located along both the outbound and return tracks in proximity thereto, adapted to supply motive power to the engines, substantially as set forth.

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

HENRY FLAD.

Witnesses:

EMORY S. FOSTER,  
C. H. DANA.