

A. B. DU PONT.
 CAR ADAPTED FOR SUBWAY USE.
 APPLICATION FILED APR. 7, 1909.

945,247.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.

FIG. 1.

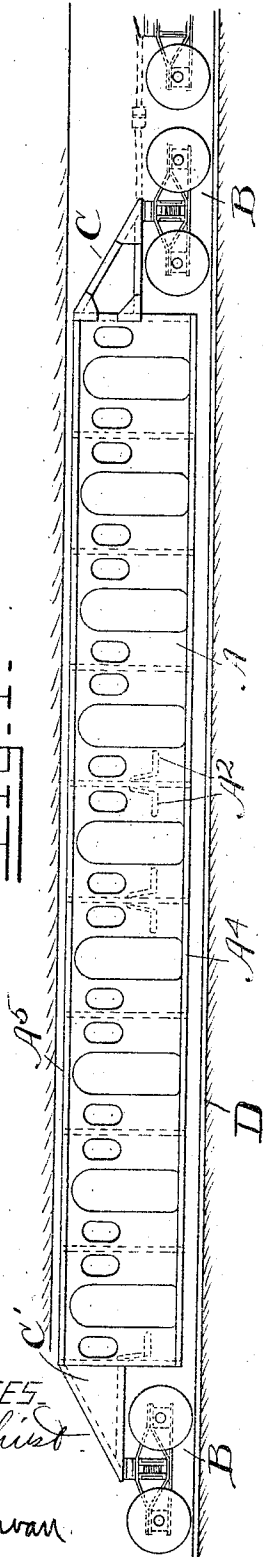


FIG. 2.

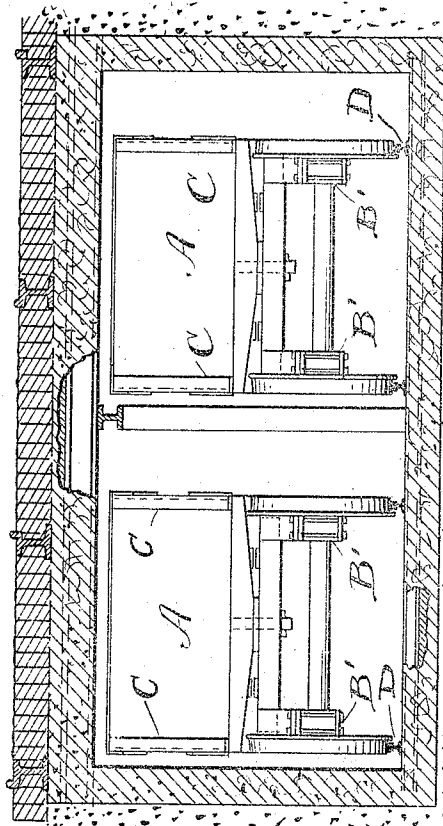
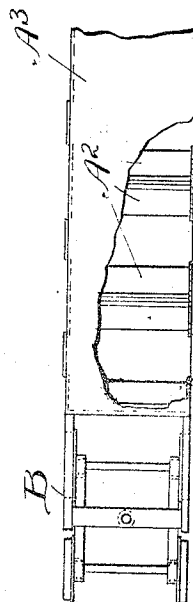


FIG. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

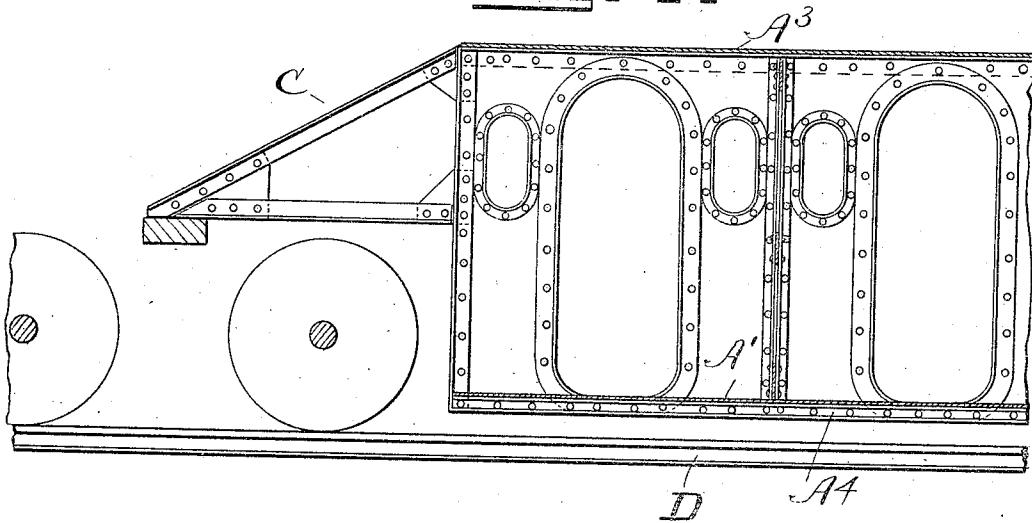
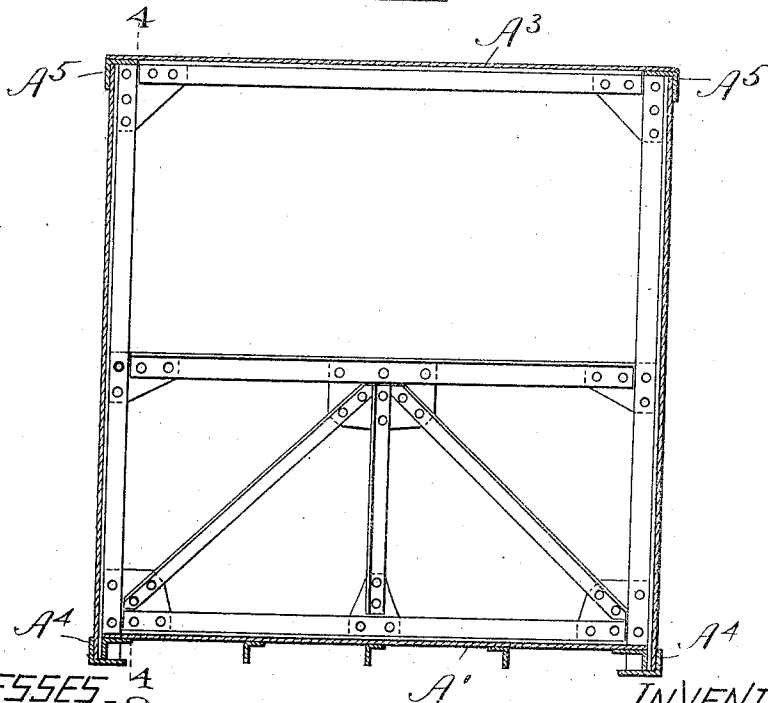


Fig. 5.



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UNITED STATES PATENT OFFICE.

ANTOINE B. DU PONT, OF CLEVELAND, OHIO.

CAR ADAPTED FOR SUBWAY USE.

945,247.

Specification of Letters Patent.

Patented Jan. 4, 1910.

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To all whom it may concern:

Be it known that I, ANTOINE B. DU PONT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Cars Adapted for Subway Use, of which the following is a full, clear, and exact description.

The present invention relates to cars especially adapted for subway purposes,—that is to say, which derive their main value from those characteristic features of construction which are of marked utility in connection with subways, although the same cars are quite capable of operating elsewhere.

The object of the invention has been to provide a car capable of being constructed so as to carry as great a number of passengers as the ordinary subway car but having characteristics making it unnecessary for a subway in which it is used to have those large dimensions which have hitherto been considered unavoidable, thus making it possible to install subway service in localities and communities otherwise unable to afford it.

With the construction of car described below it will be seen that a subway for its use could be placed with its floor about eight or eight and one-half feet below the surface of the ground, and the total interior height of the tunnel, away from the stations, need be only about six feet. The importance of this fact will be apparent at once in considering the mere saving in excavation even assuming the width of the tunnel to be the same as is now customary and the excavation to be made in the usual manner; but, the construction of car which I describe below is one which can, without diminishing the carrying capacity for seated passengers, be made of a width substantially no greater than the width of the standard gage track employed and thus permit a corresponding reduction in the actual width and cost of excavation of the tunnel. Furthermore, such a tunnel, the bottom of which is no farther below the street level than stated, need not be made as tunnels are usually made, but may be dug as an ordinary ditch, the ditch being afterward covered over with I-beams or reinforced concrete construction for receiving paving or the surface roadbed. In addition to this last named advantage, and also as a consequence of the floor level being so near the surface, the lateral pressure at the bottom of the side walls and the upward pres-

sure from the floor due to the mass of earth about such a subway will obviously be much less than would be the case in the ordinary subway where the floor lies far beneath the surface of the ground, and consequently the great cost of thick wall and floor construction for resisting lateral and upward pressure is decreased. In other words, the car which I have invented is of great importance considering the possibilities which it brings to subway installation in permitting the engineer to work within limits of space and cost hitherto considered absolutely impossible and permitting cities to have rapid transit where it might otherwise be forever unattainable.

A detail description of the structure is had in the following specification with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of a car constructed in accordance with the general principle of my invention. Fig. 2 is an end view of two cars in the subway, the tracks being in each case shown as shifted to one side as might be advantageous in turning curves. Fig. 3 is a detail top plan of a car end partly broken away to show the arrangement of seats within the car. Fig. 4 is an enlarged sectional elevation showing one of the supporting plate girders, the seats being omitted. Fig. 5 is an enlarged vertical cross section through the car at the point where the doors are located.

The car as an entirety it will be seen comprises a passenger carrying body A, having an interior height of no greater than normal amount, and two trucks B B, one at each end, between which trucks the entire passenger carrying body is hung. The supporting connections between the trucks and the body are projecting brackets of either truss type C or equivalent plate girder construction C' having the compression section attached to the car body near the upper end thereof, the advantage of this construction appearing below.

The passenger carrying body supported by these projections hangs down between the trucks, the floor A' being lowered so as to be in close proximity to the trackway D, the passenger seats A² being at the normal height above the floor and the ceiling or roof A³ being lowered as much as the floor, thus saving from the total height of the car substantially the entire height of the trucks.

The species of my invention which I have

here shown embodies an arrangement in which the seats extend transversely from side to side, arranged in pairs facing each other with sliding doors in the side of the car between each pair. With this arrangement no aisle space whatever need be provided and the ingress and egress of the number of passengers occupying each pair of seats may be rapidly effected through the entrance provided. By adopting this feature the car body may be made of a width not substantially greater than that of the standard gage track and accommodate as many as four people upon each seat, this being the number carried in two transverse seats extending from the sides to the aisle in an ordinary car of prior construction. With this narrow width the passengers may find their way to and from the exterior end of each compartment quickly and without difficulty even should those seats in the compartment near the open door to be occupied. To bring the trucks within the desired limits their journals B' are placed inside the wheels and the axles terminate substantially flush with the exterior face of the wheels. The body can thus be made of a width substantially the distance between the outside faces of opposite wheels on the truck.

While it might appear at first glance that a single car with this transverse seat arrangement could not contain as great a number of passengers as the ordinary car, nevertheless this is not a fact so far as seated passengers are concerned. Furthermore, owing to the feature of construction to be described below, I am enabled to make my car of great length so that each car will, as a carrying unit, be capable of containing fully as many passengers as any car now in use. The feature referred to is one in which the supporting members of the cars are of plate girder or truss construction with a large number of transverse passageways distributed along the length between the main tension member A⁴ and the main compression member A⁵ of the support. The truss or plate girder either terminates in or is securely connected to the above described bracket projections C or C' which extend beyond the car body and rest on the truck. This combination of structural features enables me to make a car of great length without danger and entirely practical in operation, the car being filled and emptied, as a matter of fact, far more quickly than would be the case with a much shorter car having the doors at the ends over the trucks.

In the first part of the specification reference was made to the fact that the projecting brackets formed a particularly advantageous combination with the rest of the construction of the car. From the above description it is thought that this advantage has been made plain, since by the use

of the projecting bracket, the compression section of which is attached near the upper end of the car body, in combination with a truss or plate girder support running the length of the car body and of such vertical width as to have a number of passageways between the main tension and compression members, I can build a car of unusual length in which the great compression stress necessarily had along the entire upper length of the car will be taken care of in such manner that the car body will not be sheared off from its supports, notwithstanding the fact that it is hung entirely between the trucks. A further advantage of these projections beyond the car body lies in the fact that by such construction the trucks and the motors thereon are exposed and easily accessible for such attention as they may need.

It will thus be seen that I have attained the object of invention sought and have produced a car capable of receiving and carrying the ordinary load of passengers in a practical manner on an ordinary standard gage track, in a subway which can obviously be installed within limits of cost which have heretofore been considered impossible; but I would have it clearly understood that the roof of my car is dropped as much as the floor, so that the entire body is at most of no greater interior height than the ordinary car and hangs entirely between the trucks from which it is supported by projections from each end. It is only by this means that the full object of my invention can be attained and my inventive idea can become of value, since it is by reason of this that the tunnel may be made shallow far beyond any constructions hitherto known.

I do not pretend to be the inventor or originator of all of the elements of construction which I have here shown, some of them having been previously used elsewhere but in different arrangements and combinations. I have endeavored to point out that in the cases where these old elements enter into my claims it is the novel combination alone that I consider my own.

Having thus described my invention, I claim:

1. A railway passenger car comprising two trucks and a passenger carrying body having an interior height no greater than the normal amount and seats therein at a normal distance above its floor, the entire length of the said body being hung between the trucks by projecting brackets pivotally mounted on the trucks, said brackets projecting forward from the roof and also attached to the body below the roof, the floor lowered to be in close proximity to the track and the roof lowered as much as the floor.

2. A railway passenger car comprising

two trucks and a passenger carrying body having an interior height no greater than the normal amount and seats therein at a normal distance above its floor, the entire length of the said body being hung between the trucks by projecting brackets pivotally mounted on the trucks, said brackets projecting forward from the roof and also attached to the body below the roof, the floor lowered to be in close proximity to the track and the roof lowered as much as the floor, and a plurality of entrances through the side of the car distributed along the length thereof.

3. A railway passenger car comprising a passenger carrying body, the entire length of which body hangs between two trucks with the floor in close proximity to the track, a supporting frame for the said body comprising a girder construction in which the main compression member extends along the roof of the body, a projecting bracket of the plate girder or truss type extending beyond the body at each end and resting upon a truck, one section of the bracket being attached to the body of the car near the upper end thereof.

4. A railway passenger car comprising a passenger carrying body, the entire length of which body hangs between two trucks with the floor in close proximity to the track, a supporting frame for the said body comprising a girder construction in which the main compression member extends along the roof of the body and in which there are several transverse passageways distributed along the length of the support between the main compression and tension members, a projecting bracket extending beyond the body at each end and resting upon a truck, one section of the bracket being attached to the body of the car near the upper end thereof.

5. A railway passenger car comprising a passenger carrying body having an interior height no greater than the normal amount,

the entire length of which body is hung between two trucks and supported therefrom by projecting brackets extending from the body and pivotally mounted on the trucks, said brackets projecting forward from the roof and also attached to the body below the roof, the body floor lowered to be in close proximity to the track and the roof lowered as much as the floor, seats in the car extending transversely the entire width thereof and a plurality of entrances through the side of the body distributed along the length thereof between the transverse seats.

6. A railway passenger car comprising two trucks and a passenger carrying body hung entirely between the trucks with the floor in close proximity to the track, having an interior height of no greater than normal amount and of substantially the same width as the distance between the outside faces of the wheels, the seats therein extending across the entire width of the body and a plurality of entrances through the side of the body between the seats.

7. A railway passenger car comprising two trucks and a passenger carrying body of an interior height no greater than the normal amount hung entirely between the trucks and of substantially the same width as the distance between the outside faces of the wheels, seats therein extending across the entire width of the body, a plurality of entrances through the side of the body between the seats, the floor of the body being lowered to close proximity to the track and the roof lowered as much as the floor, the body being supported from the trucks by brackets extending beyond the body at each end thereof.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

ANTOINE B. DU PONT.

Witnesses:

J. M. WOODWARD,
H. R. SULLIVAN.