April 10, 1962 A. H. MUELLER 3,029,102

DOUBLE-DECK TRANSPORTATION DEVICE

Filed May 11, 1959 2 Sheets-Sheet 1

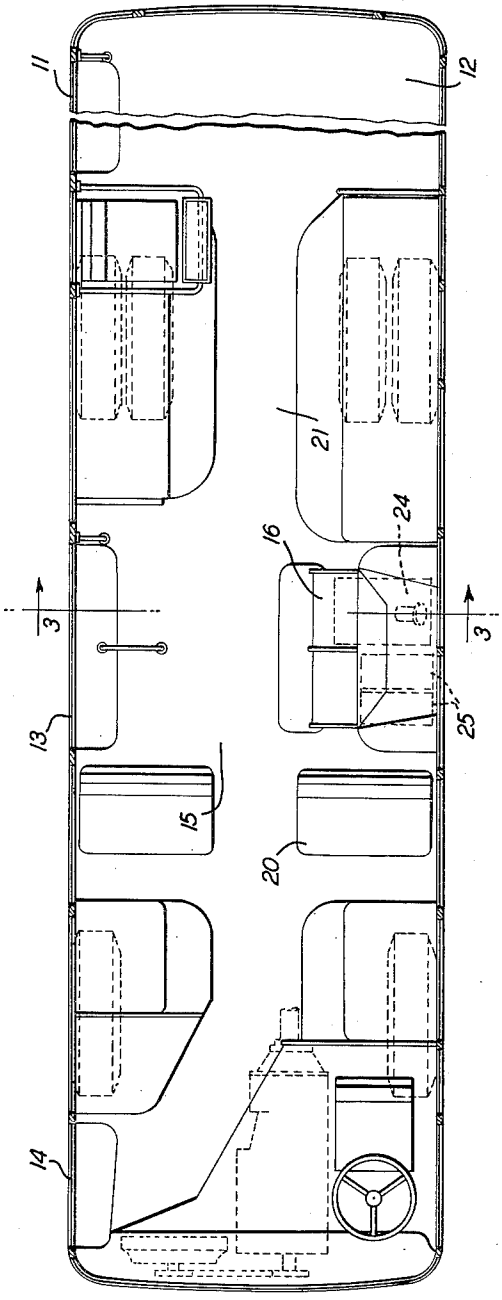


Fig. 1.

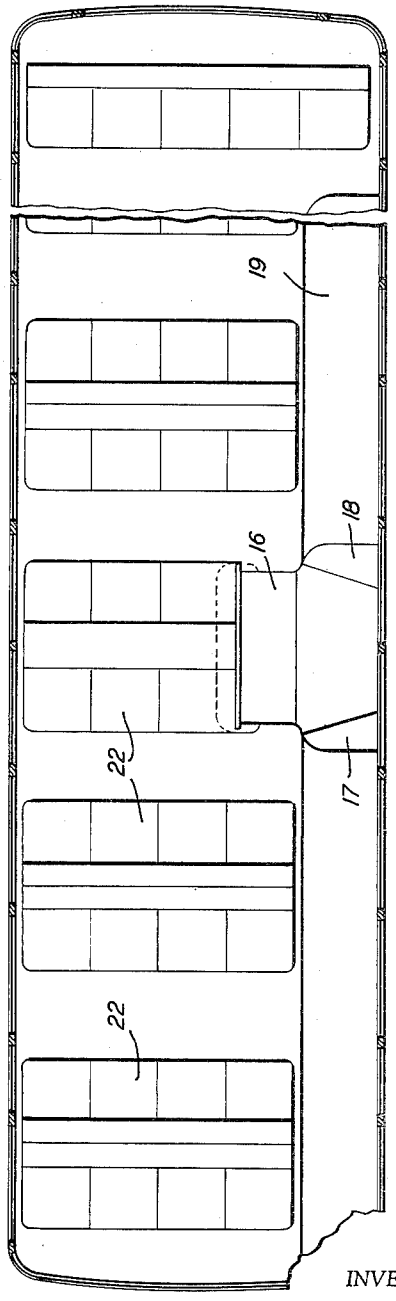


Fig. 2.

INVENTOR
ALFRED H. MUELLER

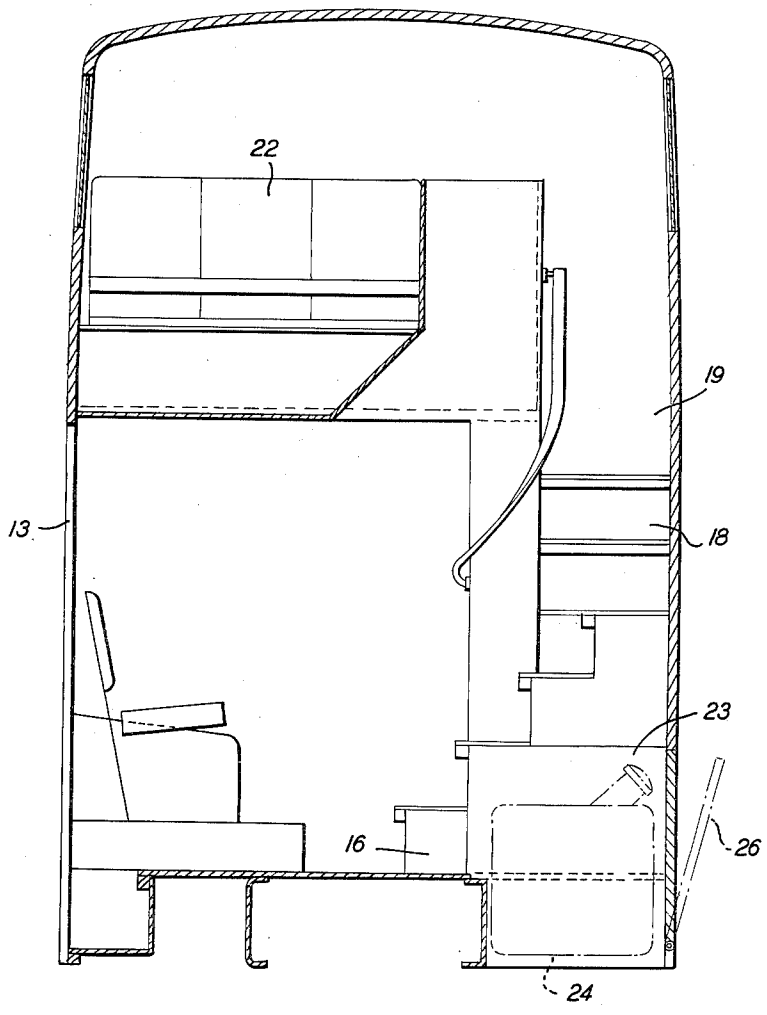
BY Dicke, Craig & Freudenberg
ATTORNEYS

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Filed May 11, 1959 2 Sheets-Sheet 2

FIG. 3.



INVENTOR
ALFRED H. MUELLER

BY Dicke, Craig & Freudenberg
ATTORNEYS

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DOUBLE-DECK TRANSPORTATION DEVICE

Alfred H. Mueller, Waiblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Untertürkheim, Germany

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7 Claims. (Cl. 296—28)

The present invention relates to an installation and arrangement for achieving a smooth flow or movement of the passengers in connection with a two-story transportation device, especially buses provided with a rear entrance and a forward exit and with a stairway disposed within the vehicle interior space leading to the upper deck of the bus.

It is known in the prior art in connection with two-story buses to provide in the lower deck a rear entrance and a forward exit. A stairway or the like leads from the entrances and exits shown in these prior art devices to or from the upper deck.

The arrangement of a rear entrance and of only a single forward exit in combination with a rear stairway to permit the passengers to ascend from the lower deck to the upper deck and with a forward stairway to permit the passengers to descend from the upper deck to the lower deck entails the disadvantage that a relatively long path has to be traversed by the passengers who have taken a seat in proximity to the rear entrance in the lower deck or in proximity to the rear stairway in the upper deck up to the forward exit. This condition causes delays at the stops which at times entails inconveniences for the other traffic participants, especially in connection with transportation devices running along rails and at stops without passenger aisles. Consequently, it is of interest in connection with such transportation devices to achieve a boarding and leaving of the bus on the part of the passengers which is as rapid as possible.

With streetcars having only one deck, in order to attain relatively short periods of delay at the stops, only one rear entrance has been selected while two exits have been provided, and more particularly, one exit within the center of the vehicle and one in the forward part thereof. By the use of such an arrangement, a constant flow or movement of the passengers through the vehicle from the rear toward the front is achieved with a distribution of the departing passengers to the center and forward exits.

It is the primary aim of the present invention to arrange in connection with two-story transportation means, especially with buses of this type, the exit and entrance to and from the lower deck and the stairways to and from the upper deck in such a manner that an uninterrupted, smooth movement of the passengers is assured and, in particular, a rapid boarding and leaving of the passengers is achieved.

The present invention proposes as solution for the problems encountered in connection with transportation devices of the type mentioned hereinabove to provide in the vehicle center a main exit of any known construction and to provide a stairway from the platform adjoining this main exit leading to the forward and rearward upper deck.

According to another feature in accordance with the present invention, the stairway which leads from the center platform of the vehicle adjoining the centrally disposed main exit extends at first in the transverse direction of the vehicle and is subsequently bifurcated in the upper portion thereof so that two individual stairways result therefrom which terminate, after rotation through an angle of about 90° in opposite directions, in the forward and rear parts of the passengers' space of the upper deck.

According to a further feature in accordance with the present invention, the stairway which forms the centrally disposed means for ascending to and descending from the upper deck is constructed in the lower part thereof of such width that it offers sufficient space for two persons walking alongside one another.

The present invention assures, in connection with two-story, transportation means, a smooth and continuous movement or flow of the passengers and a rapid boarding and descending therefrom since, in contrast to the known constructions of two-story transportation means, relatively short paths exist for passengers also when boarding or leaving the upper deck, i.e., paths reduced to about one-half the vehicle length.

By reason of the provision of the two individual stairways which start in the forward and rearward part of the upper deck and which are kept sufficiently wide in the lower part thereof for two persons alongside each other, double the number of persons may leave simultaneously the upper deck as in the known prior art constructions. In the arrangement according to the present invention, the leaving passengers have, therefore, already left the upper deck and the stairway as soon as the first boarding persons have reached the center platform over the rear boarding platform after passing the conductor.

Furthermore, by the structural combination of the ascending and descending stairway means at one and the same place within the vehicle, a constructional simplification and space-saving construction is achieved which additionally results, in an advantageous manner, in the possibility of an increase in the available seating and standing spaces within the vehicle.

Accordingly, it is an object of the present invention to provide an arrangement and construction for a motor vehicle, especially a two-story transportation device, which assures rapid boarding and leaving of the vehicle from all parts thereof.

It is another object of the present invention to provide a two-story transportation means which is so constructed and arranged as regards the entrance and exit means for the passengers thereof as to assure a smooth, continuous flow of the passengers through the vehicle.

Still another object of the present invention resides in the provision and arrangement of the entrances and exits for a two-story bus which considerably reduce the path to be traversed between the point entering and leaving the bus by a passenger, especially when utilizing the space in the upper deck.

A further object of the present invention resides in the provision and arrangement of the entrance and exit doors for a two-story transportation device which are space-saving in nature and provide additional space for the seating and standing places of the passengers.

These and other objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention and wherein:

FIGURE 1 is a top plan view of the lower deck of a two-story transportation device in accordance with the present invention;

FIGURE 2 is a top plan view of the upper deck of the two-story transportation device in accordance with the present invention; and

FIGURE 3 is a partial cross-sectional view through the upper and lower deck of the transportation device in accordance with the present invention taken within the center region of the vehicle.

Referring now to the drawing wherein like reference numerals are used throughout the three views thereof to designate corresponding parts, reference numeral 11 des-

ignates the rear entrance disposed at or near the rear end of the bus which is adapted to permit boarding of the passengers from the street to the rear platform 12. A main exit 13 which is wider than the forward exit 14 is disposed essentially in the center of the vehicle.

A centrally disposed stairway 16, which is made sufficiently wide so that it offers sufficient space for two persons alongside each other, leads from the center platform 15 adjoining the center exit 13 to the upper deck. The stairway 16 simultaneously therewith serves for purposes of enabling persons to descend from the upper deck to the lower deck.

The center stairway 16, the lower section of which extends essentially in a transverse direction with respect to the vehicle, is bifurcated in the upper section thereof and forms thereat two individual stairways 17 and 18 which may also be structurally interconnected or combined along the mutually inner sides thereof. Each of the stairways 17 and 18 terminates, after a rotation through an angle of 90°, in a respective one of the two passenger spaces disposed in the upper deck toward the front and rear in opposite directions or pass over into the uninterrupted, longitudinally extending aisle 19 of the upper deck.

Reference numeral 20 designates the seating places disposed in the lower deck of which any suitable number may be provided. It is understood, of course, that the arangement thereof within the vehicle may be changed without departing from the spirit of the present invention, that the number of seats depends on the actual length and dimension of the vehicle and that the number and arrangement thereof herein are only for purposes of illustration. Moreover, the seats 20 may be of any suitable construction.

The seats 20 in the lower deck may be reached by the passengers over the central aisle 21 which extends in the longitudinal direction of the vehicle from the rear toward the front thereof. The seats in the upper deck are designated by reference numeral 22 whereby again the arrangement and/or the number thereof may be varied depending on the actual dimensions of the vehicle while any suitable construction for the seats may also be used.

As may be seen particularly from FIGURE 3, the space 23 behind and under the central stairway 16 may be utilized for purposes of accommodating auxiliary parts, such as a fuel tank 24 and/or the batteries 25. Furthermore, a luggage space may be provided thereat. This useful space 23 behind and under the stairway 16 may be accessible from the outside thereof, for example, by means of movable lids or covers 26, possibly adapted to be locked in any suitable manner. The lids or covers 26 may be of any suitable construction, for example, may be pivotally secured in the lower part thereof and may be locked with any suitable means.

While I have shown and described one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of many changes and modifications within the spirit and scope of the present invention, and I, therefore, do not wish to be limited to the particular details described and illustrated herein but intend to cover all those changes and modifications as are encompassed by the scope of the appended claims.

I claim:

1. An arrangement for achieving a smooth movement of the passengers in a two-story transportation device, especially in a bus, comprising a passenger vehicle having a lower deck and an upper deck extending substantially coextensive with each other, entrance means to enable boarding of the passengers disposed near one end of said vehicle and providing ingress for the passengers from the outside of said vehicle to said lower deck, exit means disposed near the other end of said vehicle to enable the passengers to leave from said lower deck to the outside of the vehicle, bifurcated stairway means within the vehicle leading from said lower deck to said upper deck and constituting the only means of travel between said decks, main exit means disposed essentially in the center of said vehicle, and platform means substantially opposite said main exit means, said stairway means adjoining said platform means and leading therefrom into the front and rear part of said upper deck.

2. An arrangement for achieving a smooth movement of the passengers in a two-story transportation device, especially in a bus, comprising a passenger vehicle having a lower deck and an upper deck, entrance means to enable boarding of the passengers disposed in the rear part of the said vehicle and providing an ingress for the passengers from the outside of said vehicle to said lower deck, exit means disposed in the forward part of said vehicle to enable the passengers to leave from said lower deck to the outside of the vehicle, stairway means within the vehicle leading from the said lower deck to said upper deck, main exit means disposed essentially in the center of said vehicle, and platform means substantially opposite said main exit means, said stairway means adjoining said platform means and leading therefrom to the front and rear part of said upper deck.

3. An arrangement for achieving a smooth movement of the passengers in a two-story transportation device according to claim 2, wherein said stairway means extends in the lower part thereof essentially transversely with respect to said vehicle and is bifurcated in the upper part thereof to provide two upper stairway portions terminating in essentially opposite directions in the forward and rear part of said upper deck.

4. An arrangement for achieving a smooth movement of the passengers in a two-story transportation device according to claim 1, wherein said stairway means is of such width in the lower part thereof as to enable two persons to move alongside each other.

5. An arrangement for achieving a smooth movement of the passengers in a two-story transportation device according to claim 1, wherein the space below said stairway means forms a storage space, and means rendering said space accessible from the outside of said vehicle.

6. An arrangement for achieving a smooth movement of the passengers in a two-story transportation device according to claim 1, wherein said bifurcated stairway means extends in the lower section thereof in the transverse direction of the vehicle and is split into two upper stairway portions subtending each an angle of approximately ninety degrees and terminating in opposite directions.

7. An arrangement for achieving a smooth movement of passengers in a two-story transportation device, especially in a bus, comprising a passenger vehicle having a lower deck and an upper deck, said lower deck and said upper deck extending substantially coextensive with each other, entrance means to enable passengers to board said vehicle disposed near the rear of said vehicle and providing ingress from the outside of said vehicle to said lower deck, main exit means disposed essentially in the center of said vehicle at one side thereof, platform means substantially opposite said main exit means adjacent the other side of said vehicle, stairway means adjoining said platform means and communicating between said lower deck and said upper deck, said stairway means having a lower part of a width enabling two persons to move alongside each other and having an upper part being bifurcated to provide two stairway portions terminating in essentially opposite directions in the forward and rear parts of said upper deck, and further exit means disposed near the front of said vehicle, said entrance means, said main exit means and said stairway means thereby enabling both upper stairway portions to be utilized by departing upper deck passengers while incoming passengers are proceeding from the entrance means at the rear of the vehicle to said stairway means.

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