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ESCAPE LADDER

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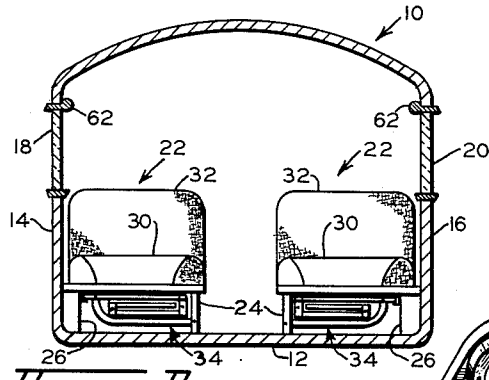


FIG. 1.

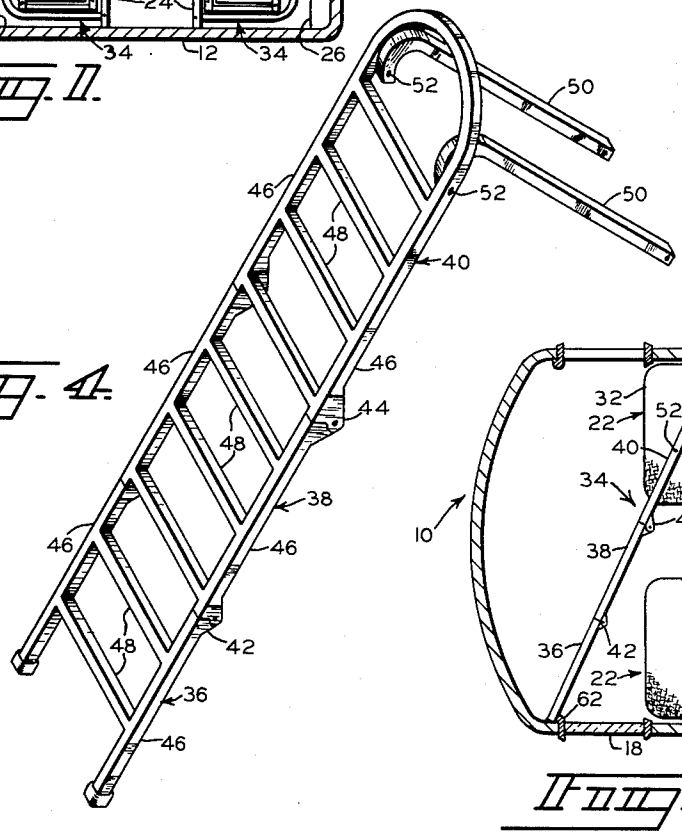


FIG. 4.

FIG. 2.

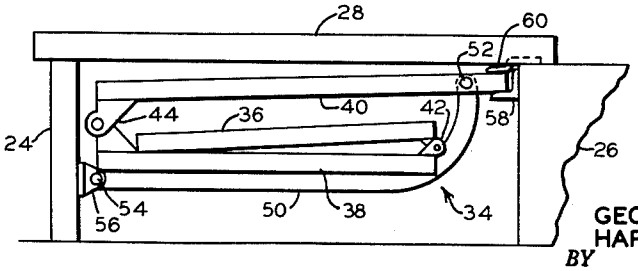


FIG. 3.

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ESCAPE LADDER

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This invention relates to an escape ladder for a bus or similar vehicle, and more particularly for a school bus.

Although school buses and similar vehicles are usually provided with an escape door or openings in addition to the main entrance door, these are sometimes jammed or blocked in an accident and, where a bus is tipped over on its entrance side, the entrance door is blocked and any escape opening on the opposite side is inaccessible. Under these circumstances an easy means of evacuation is highly advantageous and, in fact, a necessity. Most school buses are equipped with windows, the frames of which can be pivoted outwardly to provide an opening large enough for a child to crawl through, but if these openings are at the top of an overturned bus there is almost no way for a child to reach them.

The present invention relates to an escape ladder for buses, which ladder is especially designed to enable passengers to reach escape openings on an upper side of a bus when it is lying on its side. The new ladder is made in pivotally connected sections, with the uppermost section having pivotally attached links which connect that section to the bus for support thereby, and also space the ladder sections away from the seat so as to be more closely aligned with an escape opening when the ladder is extended. The ladder sections are designed to be supported on the connecting links and located in a relatively small area under the seat when the ladder is collapsed. In practice one of the ladders is placed beneath each of a pair of seats on opposite sides of the aisle of the bus so that one is always available regardless of which side of the bus is against the ground.

It is, therefore, a principal object of the invention to provide an escape ladder for school buses, or similar vehicles.

Another object of the invention is to provide a collapsible escape ladder for vehicles which can be located under a seat thereof.

Still another object of the invention is to provide an escape ladder for vehicles, which ladder can be easily moved to an extended position when the vehicle is on its side.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawing, in which:

FIG. 1 is a view in lateral cross section of a school bus with escape ladders located under two seats on opposite sides of the aisle of the bus in accordance with the invention.

FIG. 2 is a view in lateral cross section of the bus shown in FIG. 1 but lying on its side with one of the escape ladders in an extended position;

FIG. 3 is an enlarged view of part of one of the seats and one of the escape ladders shown in FIGS. 1 and 2 with the ladder in a collapsed position under the seat; and

FIG. 4 is a view in perspective of the escape ladder of FIGS. 1–3 when in its extended position.

Referring more particularly to FIG. 1, a bus indicated generally at 10 includes a floor 12, and side walls 14 and 16 with windows 18 and 20. The windows 18 and 20 preferably are of the pushout type which are being used with greater frequency in school buses and in commercial vehicles for escape purposes. Seats 22 are located adjacent each of the side walls 14 and 16 on supports or legs 24 and supports or body sills 26. Frames 28 are held by these supports and cushions 30 rest on the frames with the usual backs 32 attached to the frames 28 behind the cushions 30.

Beneath two of the seats 22, on opposite sides of the center aisle of the bus 10, are escape ladders 34 which fold out of the way into concealed, collapsed positions below the seat cushions 30 when not in use. Each of the ladders 34 has three climbing sections including a lower section 36, an intermediate section 38, and an upper section 40, all of which are shorter than the width of the seat 22 so as to fit thereunder. The sections 36—40 are pivotally connected together, with the lower and intermediate sections 36 and 38 joined by pivoted ears 42 and with the intermediate and upper sections 38 and 40 joined by additional pivoted ears 44, the latter ears being longer than the former ones so that the upper and intermediate sections 40 and 38 can be spaced apart sufficiently when in a collapsed position, as shown in FIG. 3, to accommodate the lower section 36. The sections 36—40 are designed to pivot in the same direction when being swung from the collapsed to the extended position because it has been found that less confusion results with this arrangement, particularly under emergency circumstances. Each of the sections 36—40 includes the usual longitudinal side supports 46 and rungs 48 (FIG. 4).

Two generally L-shaped supporting links 50 are pivotally connected by pins 52 to the upper end of the upper section 40 and are pivotally connected by pins 54 to a supporting bar 56 which is attached to intermediate portions of the seat supporting legs 24. When the ladder 34 is in its collapsed position (FIG. 3), it is supported at one end through the bar 56 which is connected to one end of the supporting link 50 and is supported at the other end by a bracket 58 which is attached to the seat support 26 and releasably holds the upper section 40 against rattling. The intermediate section 38 and the lower section 36 of the ladder 34 then rest on the supporting links 50 which are connected to the inner surfaces of the uprights 46 of the upper section 40 and, hence, are spaced apart a distance less than the widths of the sections 36 and 38 in order to contact and support these sections. The section 40 is longer than the section 38 which is longer than the section 36 to enable the sections to be collapsed in the manner discussed above.

A retaining clip 60, which is attached to the support 26 near the bracket 58, holds the ladder 34 in place and prevents it from easily swinging outwardly even when the bus is on its side. However, particularly when the bus is on its side, the ladder 34 can be easily removed from the clip 60 by pulling outwardly on the lower end of the upper section 40 or on the upper end of the intermediate section 38, which causes the upper section 40 to pivot about the pivot pins 52 and swing the upper end of the upper section 40 away from the clip 60 as the other end of this section is moved outwardly. Thus, the ladder 34 can be moved from its collapsed position of FIGS. 1 and 3 to its extended position of FIGS. 2 and 4 very easily, with the lower end of the upper section 40 being within the reach of most children when standing on the side 14.

When the ladder 34 is moved to its extended position, the lower end of the lower section 36 is preferably placed above the upper window trim 62 (FIG. 2) on the lower side of the bus which will retain the ladder in position. However, even if the lower end of the section 36 were to rest on the lower windows 18 these windows are of such strength that they will readily carry the weight of a child and are fully capable of supporting the ladder 34. It may be noted that with the lad-

der in the extended position, the supporting links 50 position the sections 36—40 away from the seat frame 28 and generally align the sections with the upper window 20 to enable a child to escape more easily therethrough after pushing the upper window out of the way. The other escape ladder 34 under the opposite seat 22 functions exactly the same as the one described, if the bus is lying on its opposite side.

Various modifications of the above described embodiment of the invention will be readily apparent to those reading the above description and who are versed in the art. It is to be understood that such modifications can be made without departing from the scope of the invention, if within the spirit and tenor of the accompanying claims.

We claim:

1. In combination with a seat of a vehicle, said seat including a supporting frame and a removable cushion, an escape ladder located below said cushion when said ladder is in a collapsed position, said ladder comprising a plurality of ladder sections, each including side supports and rungs, each section being substantially no longer than the width of the cushion under which it is located, means pivotally connecting adjacent ends of said sections, a pair of supporting links pivotally connected to an outer end portion of one of said sections, said links being spaced apart a distance no greater than the distance between the side supports of at least one of said sections which is at least partially supported on said links when collapsed, and means pivotally connecting said links to legs of the vehicle seat supporting frame.

2. In combination with a seat of a vehicle, said seat including a supporting frame and a removable cushion, an escape ladder located below said cushion when said ladder is in a collapsed position, said ladder comprising a plurality of ladder sections each including longitudinal side supports and rungs, means connecting adjacent ends of said sections, a pair of supporting links pivotally connected near outer ends of one of said sections, said links being spaced apart a distance no greater than the distance between the side supports of at least

one of said sections which is at least partially supported on said links when collapsed, and means pivotally connecting said links to a portion of at least one of the vehicle supports for the seat to at least partially support and locate said ladder in spaced relationship beneath said cushion.

3. In combination with a seat of a vehicle, said seat including a supporting frame and a removable cushion, an escape ladder located below said cushion when said ladder is in a collapsed position, said ladder comprising a plurality of ladder sections, each including longitudinal side supports and rungs, each section being substantially no longer than the width of the seat cushion under which it is located, and being pivoted at end portions to adjacent end portions of adjacent sections, a pair of supporting links connected near outer end portions of one of said sections, and means for pivotally connecting said links below said seat cushion with said sections located above said links when collapsed.

4. The combination according to claim 3 wherein said links are sufficiently long to space the ladder sections from the seat when in an extended position.

5. The combination according to claim 3 and means to support one of said ladder sections below said seat cushion with all sections of said ladder below said supporting frame of said seat.

6. The combination according to claim 3 wherein each of said ladder sections is longer than the subjacent section when the ladder is in an extended position.

7. The combination according to claim 3 wherein all sections pivot in a common direction when the ladder is moved from the collapsed position to an extended position and vice versa.

References Cited in the file of this patent

UNITED STATES PATENTS

1,085,629 Perkins ..... Feb. 3, 1914

FOREIGN PATENTS

87,739 Netherlands ..... Mar. 15, 1958