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CRASH SEAT FOR HIGH SPEED CONVEYANCES

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2 Sheets-Sheet 2

Fig. 4.

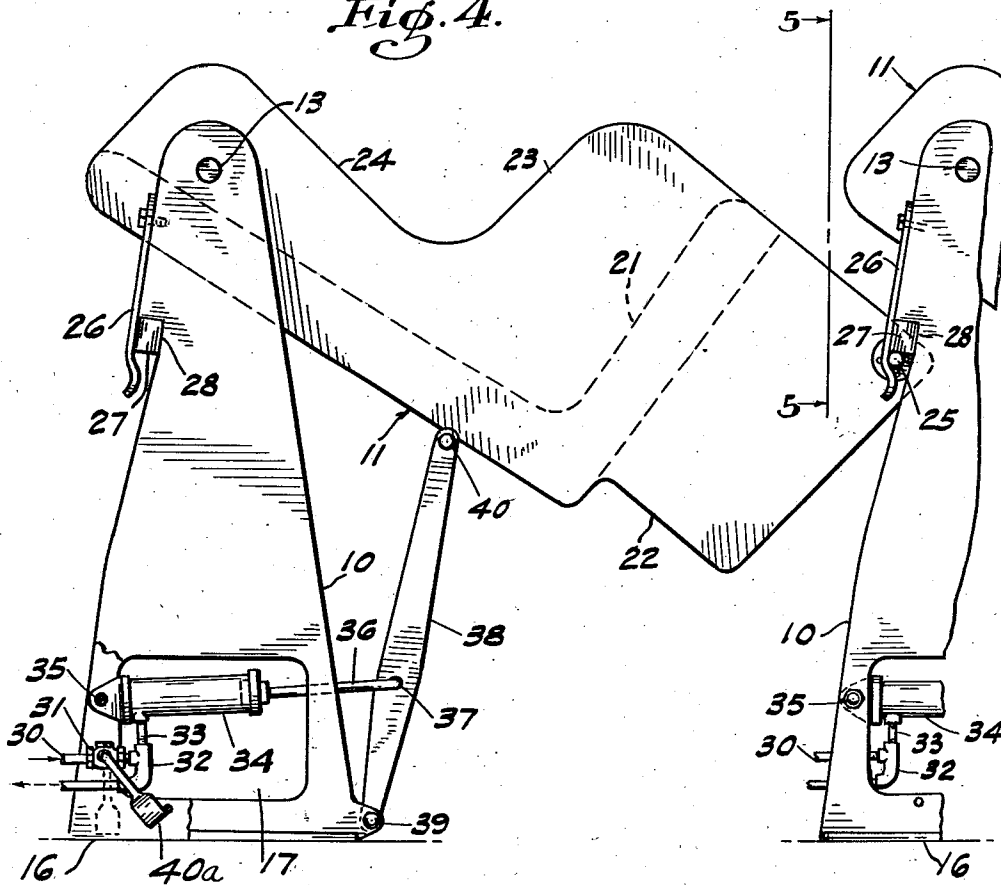
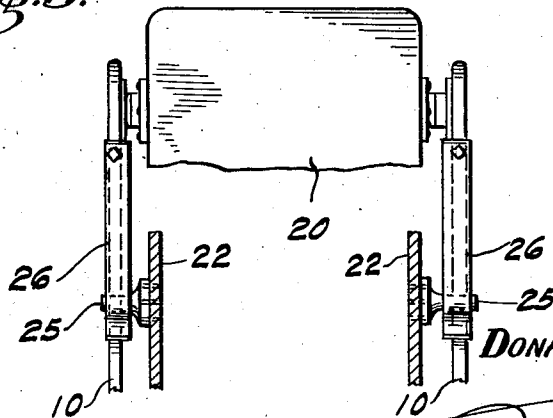


Fig. 5.



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CRASH SEAT FOR HIGH-SPEED
CONVEYANCES

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7 Claims. (Cl. 155-9)

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This invention relates to a crash seat for high speed conveyances.

At the present time when the speed of a fast traveling conveyance is suddenly arrested, passengers occupying seats therein are thrown bodily forward against seats in front of them, thus severely injuring them, frequently with a fatal result.

It is an object of the present invention to safeguard passengers traveling as above indicated, by providing a seat structure which, when the advance of the conveyance is suddenly retarded, will move forward in such a manner as to carry the occupant's body forward a considerable distance, such forward movement lessening the suddenness of the impact upon the passengers and thus safe guarding against serious injury.

Another object of the invention is to provide for swingably supporting a passenger's chair in such a manner that when the conveyance suddenly stops the seat will automatically swing to a position wherein the body of the occupant will be so positioned by the first part of the arrested movement that if a final crash occurs its injurious effect will be greatly lessened. This advantageous result is obtained principally by protecting the head and chest from direct impact with an object in advance of the seat being occupied.

A further object of the invention is to provide a multiple seat structure which, in combination with the safety features above mentioned, will serve as a reinforcement for the framework of the conveyance so that it will not be wrecked to such an extent when a crash occurs. This object is obtained, in part, by providing means whereby a plurality of seats are automatically joined to reinforce each other and the conveyance as a whole when an impact occurs.

Still another object is to provide means automatically operated by a sudden reduction in the speed of the conveyance to supply an operating fluid under pressure for the purpose of accelerating the movement of the seat toward the position in which it safeguards its occupant against bodily injury produced by a sudden stoppage.

Yet another object is to provide in combination with the automatic chair positioning means mentioned a manually controllable means for mechanically moving the chairs to the impact reducing position whenever a crash is anticipated.

Other objects, features and advantages of invention will hereinafter appear.

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Referring to the accompanying drawings which illustrate what is at present deemed to be a preferred embodiment of the invention.

Fig. 1 is a side elevation of the passenger chair in its normal position, constructed in accordance with the principles of the invention.

Fig. 2 is a rear elevation of the structure shown in Fig. 1, parts adjacent to one of the upper pair of pivot members being sectioned.

Fig. 3 is a vertical section on line 3-3 of Fig. 1.

Fig. 4 is an elevation similar to Fig. 1, except that the chair is shown in the forwardly swung position which it automatically assumes when a crash occurs. A fragment of the chair in advance is included in this view to illustrate the automatic linking together of the chairs.

Fig. 5 is a fragmentary vertical section on line 5-5 of Fig. 4.

Referring in detail to the drawings, each chair unit comprises a pair of twin upstanding chair supports or standards 10, 10 and the swingable chair structure 11 carrying in its upper part at each side an outwardly projecting trunnion 13 for which a bearing 14 is provided in the standard 10 at its side of the device.

Each standard 10 is shown as a somewhat triangular rigid plate which tapers toward its rounded top and which has an outwardly directed foot flange 15 securable to the floor 16 by any desired conventional means. Each standard desirably has an opening 17 cut out of its lower portion to lighten its weight and to afford access to parts to be manually operated.

The chair proper 11 is shown comprising a back member 20, a seat portion 21 and side portions 22 which afford arm rests 23, and above said arm rests each has a narrowed upper portion 24, these chair parts being of a conventional character and needing no further description.

When the chair is in the normal, down-swung position shown in Fig. 1 the lower back corner portions of its two side members engage the floor at points slightly in advance (rightward) of points perpendicularly below its trunnions 13 so that the floor will not obstruct the swing of the chair toward the position thereof shown in Fig. 4.

An outwardly projecting stud 25 is carried by each lower front corner portion of the chair, these studs being latch members automatically interlocking with resilient latch arms 26 attached to the next standards 10 in advance when a sudden retarding of the speed of the conveyance causes the chair under the urge of inertia, to swing forwardly and up to the position shown in Fig. 4. In swinging up to this position the

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studs 25 strike elastic bumpers 27 held in angular seats 28 provided for them in the standards 10.

An automatically actuated mechanical means is provided to accelerate the upswinging of the chairs already mentioned. This means derives its power from fluid under pressure supplied through a conduit 30 leading through a valve 31 into a pipe coupling 32 from which it is conducted through a flexible tube 33 into one end portion of a piston cylinder 34. This end portion of said cylinder is pivotally supported at 35 upon the adjacent portion of the standard 10 at that side of the structure, it being understood that the structure now being described is duplicated at each side of the main assembly as shown in Fig. 3.

From the opposite end of said cylinder 34 projects the rod 36 of the piston, the projecting portion of said rod being laterally deflected at 37 to form a pivotal connection with a lever 38. Said lever has its short arm pivoted at 39 to the front part of the basal portion of the standard 10. A cross bar 40 connects the free ends of the two levers 38 with each other, said bar abutting in a slidable manner with the chair back 20 so as to swing the chair towards a position shown in Fig. 4, or at times aid in so swinging the chair.

A weighted inertia-operable pendulum 40a is provided at each side of the general assembly to turn on the fluid pressure supply to operate the piston contained within the cylinder 34 whenever a sudden lessening of the speed of the conveyance occurs. Said pendulum is so mounted as to swing relative to the conveyance in the direction of the travel of the latter and comprises an angular stem 41 which opens the valve 31 whenever the pendulum swings forward because of a sudden retarding of the speed of the conveyance. The pendulum 40a may be manually swung forward to open the valves 31, if desired. The pipe fitting 32 communicates with a pressure relief pipe 42 controlled by a manually operable valve 45.

If it is desired to provide a means common to all the chairs of a row to automatically accelerate their forward swing when a sudden retardation of the conveyance occurs, this may be accomplished by providing each side row of levers 38 with a single long operating rod corresponding to the rod 36 shown in Fig. 4 and providing, in place of the piston cylinder for said rod 36, a single large piston likewise having a valved fluid pressure supply, the valve of which will be opened by the inertia impelled means shown. This arrangement could be more quickly manually operated (by turning on the fluid-pressure supply) and when operated the long piston rod common to the row of levers at each side would additionally brace the aircraft (or other conveyance) against the effect of a crash.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the subject matter claimed.

What is claimed is:

1. In a structure of the kind described, a plurality of pairs of chair supports mounted in a conveyance in a spaced apart relation relatively to the direction of travel of the conveyance, a forwardly facing chair proper mounted on each pair of said supports and having its upper part attached swingably to the supports, so that the chairs all move forwardly under the urge of inertia when the speed of the conveyance is sud-

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denly retarded, and catch means arranged in a cooperative relation to each chair and the supports in advance of it to maintain the chair subject to release in an upswing position assumed as a result of a sudden retardation of the advance of the conveyance.

2. In a structure of the kind described for high speed conveyances, the combination, with a swingably mounted chair and a mounting means comprising a support therefor; of a lever structure having a lower end portion pivotally connected with said mounting means and an upper end portion engageable with said chair to swing it forwardly, a piston mounted upon said support and connected with said lever structure above its pivoted lower portion, a cylinder wherein said piston operates, a fluid pressure supply for said cylinder, a valve to control said pressure supply, and inertia operable means mounted upon said support and connected with said valve automatically to open it when the advance of the conveyance is suddenly retarded.

3. In a structure of the kind described, a plurality of pairs of chair supports mounted in a conveyance in a spaced apart relation relatively to the direction of travel of the conveyance, a forwardly facing chair proper mounted on each pair of said supports and having its upper part attached swingably to the paired supports, so that the chairs all move forwardly under the urge of inertia when the speed of the conveyance is suddenly retarded, and combined stop and catch means arranged in a cooperative relation to each chair, said catch means being carried by the paired supports of the chair next in advance to maintain the former chair subject to release in an upswing position assumed as a result of a sudden retardation of the advance of the conveyance.

4. In a structure of the kind described, a pair of twin chair supports attached to the floor of a conveyance in an upstanding, spaced apart position, a chair proper occupying the space between said supports and having its upper part pivotally connected to each of said supports, there being a normally unobstructed space in advance of the chair proper so that it is swingable in the direction of travel of the conveyance, and combined stop and catch means positioned in the conveyance in advance of said chair to engage and releasably support the latter when it swings forwardly under the urge of its inertia as a result of a sudden retardation of the speed of the conveyance, said chair carrying a latch member in its lower part positioned to cooperate with said catch means.

5. In a structure of the kind described, a pair of twin chair supports attached to the floor of a conveyance in an upstanding, spaced apart position, a chair proper occupying the space between said supports and having its upper part pivotally connected to each of them, there being normally an unobstructed space in advance of the chair so that the chair is swingable in the direction of travel of the conveyance, a latch member carried by said chair, means positioned in the conveyance in advance of said chair in the path of its swing to engage and releasably support said chair when it swings forwardly as a result of the action of its inertia whenever a sudden retardation of the speed of the conveyance occurs, said means including a catch to cooperate with said latch means; and means to accelerate the inertia-impelled forward swing of the chair proper, the latter means comprising a bar transversely en-

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gaging the back of the chair, a lever for each support, each having a lower end portion pivoted to its respective support of said pair of supports and an upper end portion connected with the end portion of said bar at its side of the chair, piston means including a piston rod carried by each support, said piston rod being pivoted to said lever, a valve-controlled fluid pressure supply for operating the piston of said piston rod, and means mounted upon the conveyance and including a pendulum actuated by sudden retardation of the speed of the conveyance to open the valve of said fluid pressure supply, said pendulum being connected to said valve.

6. In a structure of the kind described, a support attached to the floor of a conveyance in an upstanding position, a forwardly facing chair proper having its upper part swingably attached to said support so that the chair proper is swingable about a horizontal axis in relation to the conveyance in the direction of travel thereof, means positioned in the conveyance in advance of said chair in the path of its swing to engage and releasably support said chair when it swings forwardly as a result of the action of its inertia whenever a sudden retardation of the speed of the conveyance occurs, fluid pressure actuated means operatively connected with said chair at a point below its aforesaid swingably attached part to accelerate its aforesaid forward swing, a conduit to supply fluid under pressure to the latter means, a valve in said conduit to control the fluid flowing through it, and a normally, vertically positioned, weighted inertia-operable pendulum connected to said valve, said pendulum due to inertia impelled by the sudden retardation of the speed of the conveyance, being automatically moved forward to operate said valve, said valve remaining closed when said pendulum is vertical.

7. In a structure of the kind described, a support attached to the floor of a conveyance in an

upstanding position, a forwardly facing chair proper having its upper part swingably attached to said support, there being an unobstructed space in advance of the chair so that said chair is swingable in the direction of travel of the conveyance, a latch member carried by the lower part of the chair, means mounted on the conveyance in advance of said chair in a forwardly spaced relation thereto and provided with a catch to engage said latch member and releasably support said chair proper when it swings forwardly under the urge of its inertia as a result of a sudden retardation of the speed of the conveyance, fluid pressure actuated means mounted upon the conveyance and connected with said chair to accelerate its forward swing, a valve controlling pressure supply to the latter means, and an inertia-operable part having connection with said valve and being adapted to move against the opposition of gravity in relation to the conveyance in the direction of the travel of the latter to actuate said valve and put into operation said fluid pressure actuated means when said inertia-operable part receives an inertia impulse resulting from retardation of the advance of the conveyance.

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