March 5, 1935. J. H. GUFFEY 1,993,341

AIRPLANE DISCHARGING APPARATUS

Filed May 31, 1933 2 Sheets-Sheet 1

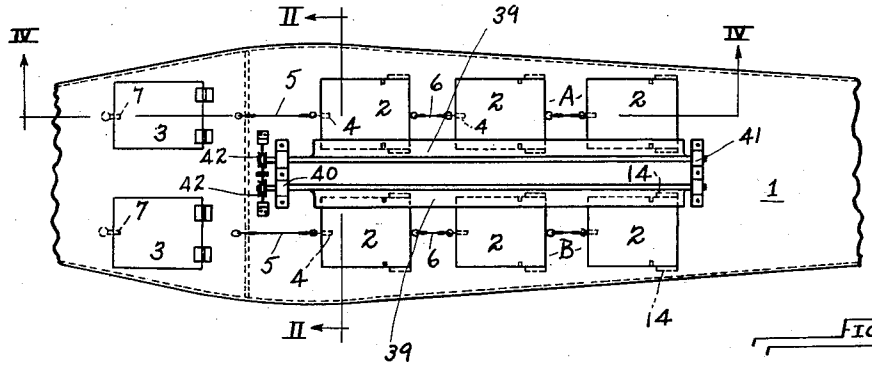


Fig. I

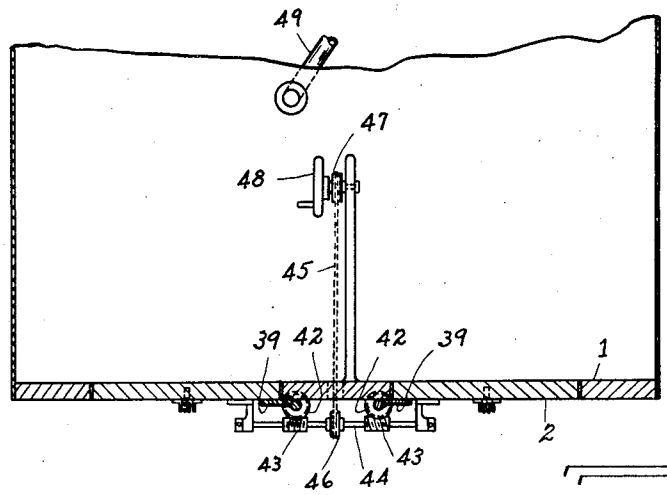


Fig. II

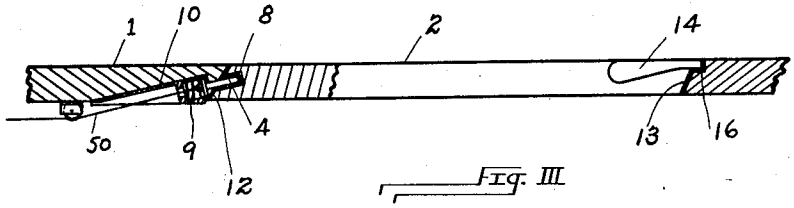


Fig. III

INVENTOR

John H. Guffey

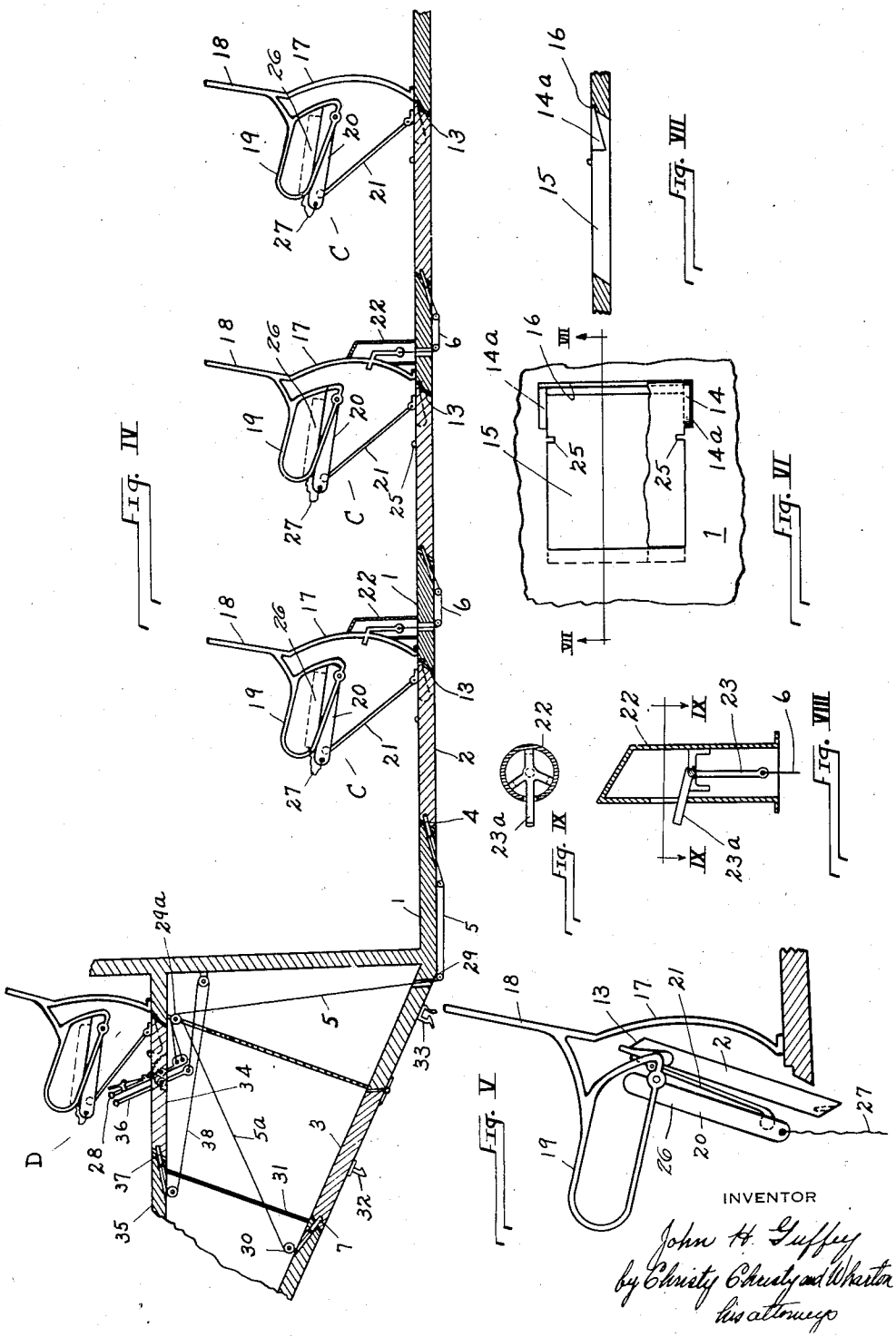
by Christy & Vicary and Wharton

his attorneys.

March 5, 1935. J. H. GUFFEY 1,993,341

AIRPLANE DISCHARGING APPARATUS

Filed May 31, 1933 2 Sheets-Sheet 2



Patented Mar. 5, 1935 1,993,341

UNITED STATES PATENT OFFICE

1,993,341

AIRPLANE DISCHARGING APPARATUS

John H. Guffey, Pittsburgh, Pa.

Application May 31, 1933, Serial No. 673,646

14 Claims. (Cl. 244—21)

This invention relates to passenger-discharging apparatus for airplanes.

A general object of the invention is to provide simple and practical means whereby passengers may, without volition of their part, be successfully landed by parachute from an airplane which is in some difficulty of a nature permitting the discharge of passengers.

A more specific object of the invention is to provide simple means of but slight weight whereby a pilot may by a single operation discharge passengers from an entire line of seats extending along a passenger plane, it being possible for the pilot to free himself from the plane, but only after he has initiated the action which results in the discharge of the passengers.

Another object of the invention is to provide a seat and floor arrangement whereby passengers are discharged positively and smoothly in sequence, at time intervals sufficient to insure different latitudes or position for the opening of the parachutes, and to provide such a seat and floor combination that the movable floor sections, which must be withdrawn for the discharge of the passengers, are moved inwardly of the fuselage, so that they do not detract from the stability of the airplane during discharge of the passengers.

A still further object of the invention is to provide auxiliary floor-supporting means to reinforce the support of movable floor sections by the locking means withdrawable by the pilot, so that failure of one floor-supporting means does not cause an accidental discharge of a passenger, and so that the cooperation of a person other than the pilot, as for example the steward of a passenger plane, is necessary in order that the passengers may be discharged.

In the accompanying drawings Figure I is a diagrammatic bottom plan view of a passenger plane having therein two rows of seats for passengers and provision for two pilots; Figure II is a cross-sectional view taken on the line II—II of Figure I and illustrating particularly the auxiliary floor-supporting means and the operating mechanism for moving the auxiliary floor-supporting means into inoperative, or release position; Figure III is a fragmentary longitudinal section, showing one movable floor element, and the locking means therefore which is withdrawable by pilot initiated action; Figure IV is a longitudinal sectional view taken on the line IV—IV of Figure I, and illustrating the normal position both of floor sections and of the seats; Figure V is a side elevation illustrating the final position of a floor section and its associated seat in the discharge of a passenger; Figure VI is a detail plan view of a portion of the fuselage floor, showing the construction of the floor surrounding the aperture which receives one of the movable floor sections; Figure VII is a longitudinal sectional view taken on the line VII—VII of Figure VI; Figure VIII is a vertical sectional view through the trigger casing and trigger by which collapse of one floor section produces collapse of an adjacent floor section; and Figure IX is a cross-sectional view on the line IX—IX of Figure VIII.

Referring particularly to Figure I of the drawings, reference numeral I designates generally the under skin or floor of an airplane fuselage. In this floor I are two rows A and B respectively, of movable floor sections 2 through which passengers may be discharged. Two movable floor sections 3 are also shown in the outer skin of the fuselage for the discharge of the co-pilots.

Referring to Figure I of the drawings, and omitting for the present reference to the auxiliary floor-supporting means shown in Figure I, each of the movable floor sections 2 of the rows A and B is maintained in position by means of a bolt 4. A line 5 is shown extending from the locking bolt 4 of each of the two forward floor sections to the pilot's cockpit of the airplane. An independent line 6 is shown as attached to the locking bolt 4 of each of the movable floor sections of each row which lie rearwardly of the forward floor sections. Each of the movable floor sections 3 for the discharge of a pilot is likewise provided with a locking bolt 7.

Referring particularly to Figures III, VI, and VII of the drawings, it will be seen that each of the movable floor sections is attached to the main floor 1 only by its associated locking bolt 4. This locking bolt 4 enters a suitable ferruled socket 8 in the forward edge of the floor section, and is normally forced therein by a coil spring 9 mounted in a bracket 10 on the main floor 1. A line or cable, given the detail reference numeral 50 is connected with the bolt 4 for drawing the bolt from its socket.

As shown the forward edge 12 of the floor section is bevelled to slope upwardly and rearwardly, matching a complementary bevel on the main floor, so that the forward end of the floor section may fall away upon withdrawal of the bolt. The rearward edge 13 of the movable floor section is also bevelled upwardly and rearwardly, save for the provision of supporting wings 14 which project laterally at the rearward end of the floor section. These wings 14 lie in prepared seats 14a in the main floor 1 adjacent the opening 15 there-

in in which the movable floor section lies, and as shown in Figures VI and VII, may be formed to approximately match the wings 14. The rearward tips of the wing portions or members 14 extend beyond the floor section proper and lie in a transverse groove or notch 16 formed in the main floor 1 along the edge of opening 15. The movable floor section is thus firmly and safely supported in the main floor, without permanent attachment thereto.

The passenger seats, designated generally by reference letter c, are of uniform structure. As shown, each of these seats consists of a seat frame, which may, if desired, be built around to provide an upholstered chair. Each of the seats comprises curved rearward frame members, or legs 17, which have, formed integrally therewith or rigidly attached thereto, a back structure 18 and a forward frame 19. The legs or frame members 17 are rigidly mounted on the true floor 1 of the fuselage.

The occupant-supporting platform or seat proper 20 of each seat structure is pivotally mounted adjacent its rear end in the forward portion 19 of the seat frame. The pair of forward legs 21 of the seat are pivotally attached to platform 20 in its forward region, and have a pivotal attachment to the movable floor section 2 adjacent the rear edge thereof. The platform 20 is thus normally maintained in position to support an occupant by the arrangement of pivotal sections, and is foldable upon the shifting of these sections.

Each of the seats C, except the rearmost seat of the row, has mounted immediately to the rear thereof a housing 22, desirable tubular in form, which contains a trigger 23 having attached thereto the independent cable 6 for the locking bolt 4 associated with the floor section 3 immediately to the rear of that seat. The housing 22 is, of course, mounted on the true floor 1 of fuselage. As shown, trigger 23 is of L shape, having a foot 23*a* which extends outwardly through a slot 24 in the casing, and normally rests on the lower edge of this slot. In order that the trigger may be supported in aligned position in casing 22, for vertical movement in the slot 24, it is provided with a plurality of throw horizontal spider arms 23*b* arranged to contact the inner surface of the casing. As shown, the structure is so arranged that the forward extension 23*a* of the trigger projects forwardly beyond the plane of seat legs 17 in the region of its vertical movement as defined by slot 24.

Let us assume that the locking bolt 4 associated with the most forwardly floor section 2, has been withdrawn from its socket. The forward edge 12 of the floor section is thus unsupported, and tends to fall away, the rearward end of the floor section being held in the fuselage by its connection with the forward legs 21 of the seat frame. A turning movement is thus produced about the pivotal connection of the forward legs 21 with the floor section, due to the weight of occupant's supporting platform 20 of the seat structure. Desirable the pivotal connection of the seat structure turns with sufficient ease to produce this movement without the added weight of a passenger on platform 20.

The turning movement at the pivotal connection of forward legs 21 with the rearward portion of floor section 3 having been initiated, there is a folding tendency involving the occupant-supporting platform 20, so that the platform tilts forwardly, and floor section 2 is moved into a position within the fuselage with its rearward end raised. The action of raising the rearward end of floor section 2 is guided by cleats 25 on the true floor 1 of the fuselage and projecting over the opening 15 in which the floor section normally lies. These cleats 25 so limit movement of floor section 2 that the floor section turns about them to produce a guided upward movement of its rearward edge. During upward movement of the rearward edge 13 of floor section 2 it is further guided by the rearwardly-extending tips of wings 14, which contact, and between them embrace the rigidly-mounted rearward legs 17 of the seat frame, which thus form a curved track for upward movement of the rear end of the floor section 2.

The movement of floor section 2 from beneath the feet of a passenger, accompanied by the folding action, which produces a falling away of the forward edge of occupant-supporting platform 20, causes the passenger to fall, or rather to slide feet first, through the opening 15, which has been uncovered by movement of the seat section 2. Lying upon the platform 20, as its final cushioning cover is a parachute pack 26, to which the passenger has been securely strapped.

Since the passengers in a transport plane are in all probability inexperienced in parachute practice, and may be frightened by the emergency, the rip-cord 27 of the parachute is desirably attached to some portion of the seat, such as the platform 20. Desirably also the final attachment of the rip-cord 27 is to a spool of usual construction, so that the rip-cord 27 may unwind for a predetermined length before it operates to open the pack and release the parachute elements. Such previously known assembly obviously permits an occupant to fall a sufficient distance so that his parachute will surely be clear of the airplane when it opens.

As the forward floor section 2 moves upwardly along the legs 17 of the forward, or key, seat, the rear edge 13 of the floor section strikes the forwardly-projecting leg 23*a* of trigger 23. The upward movement of trigger 23, thus produced, acts by way of the short cable 6 connected with the bolt 4 of the floor section next to the rear to withdraw its bolt from that floor section. The same action as described in connection with the most forwardly, or key seat then follows in the next adjacent seat to the rear. The action proceeds successively throughout the entire row of seats, so that the passengers are progressively discharged from the entire row.

It may be here noted that when the discharging action has been once initiated by the pilot, it proceeds to completion along the entire row of seats, each seat actuating the discharging mechanism immediately to the rear. Since it is the folding action of the seat frame, and movement of the movable floor section which produces this progressive action, it proceeds wholly without the volition of the passengers, and cannot be interrupted for the remainder of the row if one panic-stricken passenger should attempt to cling to the arms of the seat, or to any portion of the fuselage, to avoid being discharged from the plane.

As previously stated, the action is initiated for each row of seats by a pilot. This is effected through line cable 5 which leads from that one of the bolts 4 which is associated with the forward seat of the row. As shown, line 5 leads over suitable sheaves 29, 29*a* to an operating lever 28

mounted adjacent the seat D of the pilot. A second line 5a, also passing over sheave 29a has its forward extremity arranged to pass over a second sheave 30, and is fastened to the latching bolt 7 which supports the movable floor section 3. Floor section 3 normally closes the discharge end of a chute 31 leading from beneath pilot seat D. Desirably, this floor section is provided with a spear-head catch 32, arranged to co-operate with a spring clip 33 on the under surface of the fuselage floor. When this door is forced rearwardly by air pressure, upon its opening it will, therefore, be caused to engage the spring clip, and be held against the under side of the fuselage, so that it may not affect the stability of the airplane.

Obviously the opening of the discharge port at the exit of chute 31 occurs simultaneously with a discharging action of the forward seat and its associated movable floor sections, since the operation of lever 28 acts on lengths of the same cable to withdraw the bolt 4 on the passenger's section, and to withdraw the bolt 7 from the pilot's discharge section. The pilot does, however, remain temporarily in the airplane, for the reason that the movable section 34 in the floor 35 of the cockpit has not been released. This floor section 34, and the seat frame D associated therewith, are identical in form and arrangement with those described for the passengers, save that this seat does not have associated with it a trigger assembly for operating seats positioned to the rear.

When, therefore, all the passengers have been discharged from his row of seats, the pilot controlling the discharge may, by operation of a second lever 36, which is connected with the bolt 37 of floor section 34 by a cable 38, cause the collapse of the floor section beneath his feet, and the folding action of the floor section and the platform on which he sits. He also is, therefore, discharged by way of chute 31, the lower end of which has been opened in the manner previously described.

While the structure as herein previously described may be considered in itself complete, I have provided additional means, independently operable, to support the movable floor sections independently of the locking bolts for attaching them to the true floor of the fuselage. The provision of such additional means is highly desirable in that it prevents the accidental discharge of a passenger because of a bolt failure, or by an accidental manipulation of his operating lever by the pilot. Any accidental discharge of a passenger would, of course, be fatal if a passenger discharged from the airplane was not properly attached to his parachute pack. While any such accidental discharge of passenger may be considered remote, the psychological effect of any such possibility upon the passengers might be so serious as to prevent universal adoption of the discharging means herein previously described.

The additional floor-supporting means which I provide are desirably operable by the steward of a transport plane, independently of any action on the part of the pilot, so that the co-operation of two persons, at least, is necessary for discharging passengers. The structure which I have provided for this purpose comprises two longitudinally winged bars 39, the wings on each of which extend laterally to lie beneath the inner edge of one row of movable floor sections. Since each of the floor sections 2 is normally supported at its rearward edge, independently of the associated locking bolt 4, the underlying wing of one of the bars 39 will prevent movement of the floor section to discharge a passenger, even though the locking bolt 4 should be withdrawn.

As shown, each of the winged bars 39 has bearings in brackets 40 and 41 disposed respectively forwardly and rearwardly of the rows of movable floor sections. The bars may be turned into and out of supporting position by means of worm wheels 42, carried by the bars and meshing with worms 43 on a cross-shaft 44. Cross-shaft 44 may be rotated by any suitable means, the means shown comprising a sprocket-chain 45, which passes over sprockets 46 and 47, on the cross-shaft 44, and on a hand wheel 48, respectively. It will be readily understood that rotation of cross-shaft 44 in one direction will swing wing bars 39 from the supporting position shown in Figures I and II into their release, or inoperative position, while opposite rotation of cross-shaft 44 serves to return the wing bars to their locking or operative position.

If my passenger-discharging apparatus be used on an airplane which does not carry the steward, usual on larger transport planes, the additional supporting means may be under the control of a pilot. It is, however, as stated above, more desirable that a member of the crew, other than the pilot, should have control of this safety lock.

Let us assume that the passengers are to be discharged from a large transport plane carrying a steward. On receiving an alarm signal from the pilot, the steward can first of all see that all passengers are in their seats, and that they are securely buckled to their parachutes. He can then operate the means for moving the winged bars out of supporting position. Desirably in practice the operating means for these winged bars would be housed in a locked cabinet, the key to which would be in the possession of the steward. The steward can then inform the pilot that all is clear in the cabinet of the airplane, as by means of speaking tube 49, and the pilot can then initiate the discharging action by means of the operating lever, or levers, under the control of the pilot or pilots.

It will be noted that the pilot or pilots are the last to be discharged from the plane, and may remain in the plane for a considerable time interval after the discharge of the passengers. This permits the airplane to be so maneuvered that it cannot dive upon any passenger whose descent is retarded by his parachute. The fact that a pilot must initiate action discharging all passengers, before he himself can be discharged from a plane which is in trouble, positively prevents a pilot from saving himself while sacrificing the passengers.

I claim:

1. In apparatus for discharging passengers from an airplane the combination of a row of seats, movable floor sections arranged one before each seat, latching means associated with each floor section, each floor section being movable as a whole to uncover a discharge opening upon withdrawal of its associated latching means, and operating connections for withdrawing said latching means comprising manually controlled connections for withdrawing the latch from one floor section and latch withdrawing means associated with each other floor section arranged to be acted upon by movement of an adjacent floor section to withdraw the latch from the floor section with which it is associated.

2. In apparatus for discharging occupants from an airplane the combination of two seats, a floor section movable as a whole associated with each seat and attached adjacent one edge thereof to its associated seat, latching means arranged to support the edge of each floor section opposite that at which it is attached to its associated seat, latch withdrawing means for one seat disposed for actuation in the path of movement of the floor section associated with the other seat, whereby movement of the one floor section upon unlatching thereof causes unlatching of the other floor section, and manually controlled connection for withdrawing the latch from the one floor section.

3. In apparatus for discharging occupants from an airplane the combination of a row of passenger seats, a pilot seat, a floor section movable as a whole associated with each seat, latching means associated with each floor section, operating connection operable from the pilot seat and arranged to withdraw the latch from that floor section of the row which is disposed next adjacent the pilot, and unlatching means associated with the latch of each other floor section and operably projected into the path of opening movement of the floor section next adjacent thereto in the direction of the pilot seat.

4. In apparatus for discharging the occupants of an airplane the combination of a pilot seat, a discharge door in the outer skin or floor of the airplane fuselage functionally beneath the pilot seat, a withdrawable latch associated with said pilot discharge door, a passenger seat having a movable floor section and withdrawable latching means therefore associated with said passenger seat, unlatching connections to the latch for the pilot discharge door and to the latching means associated with the movable floor section associated with the passenger seat respectively, said connections operable by means common to both connections and under control of an occupant of the pilot seat, a movable floor section having withdrawable latching means associated with the pilot seat, and independent means operable by an occupant of the pilot seat arranged to withdraw the latching means associated with said floor section.

5. In apparatus for discharging the occupants of an airplane the combination of a floor section arranged in an opening through the floor of an airplane fuselage with one edge of the floor section freely supported in said opening, withdrawable latching means connecting the opposite edge of said floor section to the true floor of the fuselage, with a seat having a rigid portion mounted on the true floor of the fuselage and a folding portion comprising the seat platform attached to the floor section, whereby full support for the seat platform is withdrawn and folding action is effected by withdrawal of the latching means from the floor section arranged in the said opening with the weight of the floor carried by its connection with the folding portion of the chair.

6. In apparatus for discharging the occupants of an airplane the combination of two floor sections each arranged in an opening through the floor of an airplane fuselage, the rearward edge of each floor section being supported in its opening, withdrawable latching means connecting the opposite edge of each floor section to the true floor of the fuselage, with seats each disposed to the rear of one opening in the floor, each seat having a rigid portion mounted on the true floor of the fuselage and a folding portion comprising the seat platform attached to the floor section adjacent the floor-supported edge thereof, whereby full support for the seat platform is withdrawn and folding action of the seat structure accompanied by upward movement of the rear edge of the floor section takes place upon withdrawal of the latching means for the floor section; latch withdrawing connections for the latching means associated with the rearward seat of the pair, a trigger structure for said connections mounted to the rear of the forward seat of the pair, and means guiding upward movement of the forward floor section into a path including the trigger structure in the latch withdrawing connections of the rearward seat.

7. In apparatus for discharging occupants from an airplane the combination of a row of seats, movable floor sections arranged one before each seat, a latch associated with each floor section, each floor section being movable as a whole to uncover a discharge opening upon withdrawal of its associated latch, operating connections for withdrawing said latches comprising manually controlled connections for withdrawing the latch from one floor section and latch withdrawing means associated with each other floor section arranged to be acted upon by movement of an adjacent floor section to withdraw the latch from the floor section with which it is associated, restraining means arranged to prevent movement of any floor section of the row upon withdrawal of its associated latch and thus preventing related latch withdrawing action throughout the row of seats, and independent actuating means for moving said restraining means out of its operative restraining position.

8. In apparatus for discharging occupants from an airplane the combination of a row of seats, movable floor sections arranged one before each seat, a latch associated with each floor section, each floor section being movable as a whole to uncover a discharge opening upon withdrawal of its associated latch, and operating connections for withdrawing the said latches comprising manually controlled connections for withdrawing the latch from one floor section and latch withdrawing means associated with each other floor section arranged to be acted upon by movement of an adjacent floor section to withdraw the latch from the floor section with which it is associated; with auxiliary restraining means comprising a winged bar arranged for rotation into restraining position in which by underlying the floor sections it prevents movement of any floor section of the row upon withdrawal of its associated latch and thus prevents related latch withdrawing action throughout the row of seats, and independent actuating means for moving said restraining means into and out of operative restraining position.

9. In apparatus for discharging the occupants of an airplane the combination of a movable floor section arranged in an opening through the floor of an airplane fuselage, latching means for attaching said floor section for support to the true floor of the fuselage, connections for withdrawing said latching means; with auxiliary restraining means comprising a winged bar arranged for rotation into and out of position with its wing underlying the movable floor section to thereby prevent downward movement of said floor section when its latch is withdrawn, and actuating means for rotating said winged bar into and out of restraining position operable independently of the unlatching connections.

10. In apparatus for discharging occupants

from airplanes the combination of a pilot seat, discharge opening in the airplane fuselage disposed functionally beneath said pilot seat, a collapsible closure for said opening, a passenger seat having therebefore a discharge opening, a collapsible closure for said discharge opening, supporting means disposed beneath the closure associated with the passenger seat and arranged to be brought independently into and out of supporting position, removable supporting means for the closure associated with the pilot seat and additional removable supporting means associated with the closure for the passenger seat, and actuating means common to both for removing said last named supports from supporting position.

11. Apparatus for discharging the occupants of airplanes comprising a row of collapsible seats, a row of collapsible floor sections, seat collapsing connections whereby the collapse of one floor section in the row collapses the seat associated with it, and automatic means operable between floor sections and operated by collapse of one floor section to cause in sequential action progressive collapse of all succeeding floor sections and the seats associated with them.

12. Apparatus for discharging the occupants of airplanes comprising a row of collapsible floor sections, a row of collapsible seats, collapsing connection between each seat and its associated floor section whereby the collapse of one floor section collapses the seat associated with it, and automatic means operable between floor sections and operated by collapse of one floor section to cause in sequential action progressive collapse of all succeeding floor sections and the seats associated with them.

13. Apparatus for discharging the occupants of airplanes comprising a row of collapsible seats, a row of collapsible floor sections, seat collapsing connections whereby the collapse of one floor section in the row collapses the seat associated with it, automatic means operable between floor sections and operated by collapse of one floor section to cause in sequential action progressive collapse of all succeeding floor sections and the seats associated with them, and means mounted and arranged to be brought into position positively to prevent collapse of the floor sections and their associated seats.

14. Apparatus for discharging the occupants of airplanes comprising a row of collapsible floor sections, a row of collapsible seats, collapsing connection between each seat and its associated floor section whereby the collapse of one floor section collapses the seat associated with it, automatic means operable between floor sections and operated by collapse of one floor section to cause by sequential action progressive collapse of all succeeding floor sections and the seats associated with them, and means mounted and arranged to be brought into position positively to prevent collapse of the floor sections and their associated seats.

JOHN H. GUFFEY.