Aug. 30, 1932. N. P. BRUNO 1,874,237

FLYING MACHINE SAFETY DEVICE

Filed July 22, 1930

Fig. 1

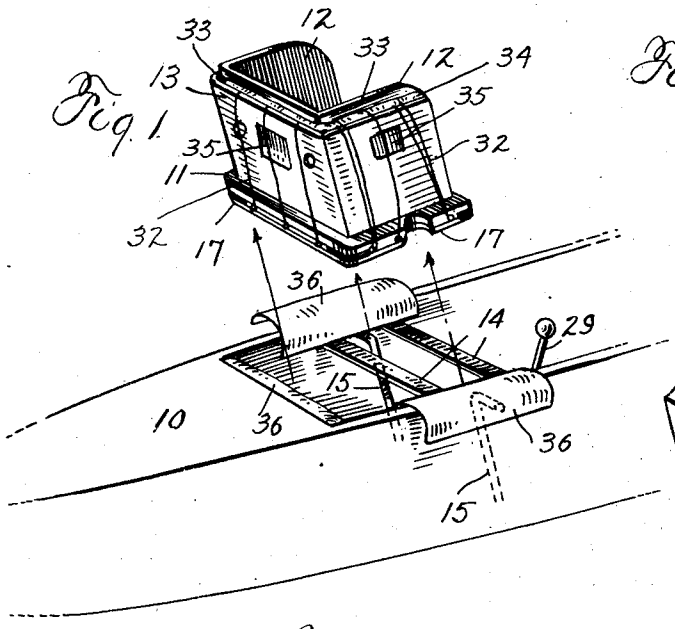


Fig. 2

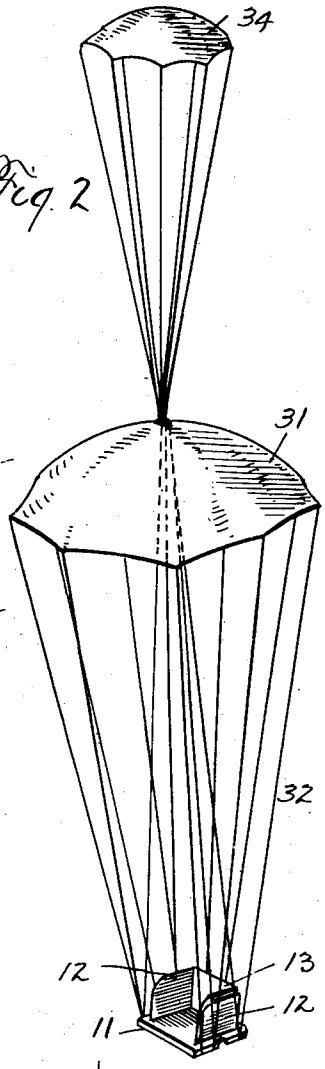


Fig. 3.

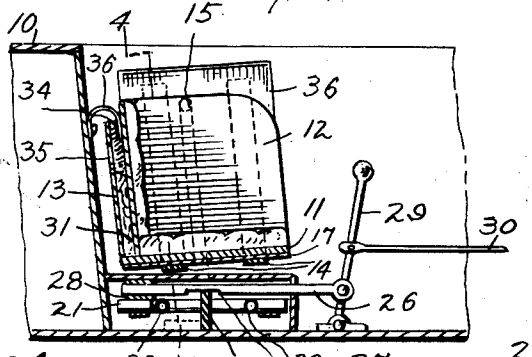


Fig. 4.

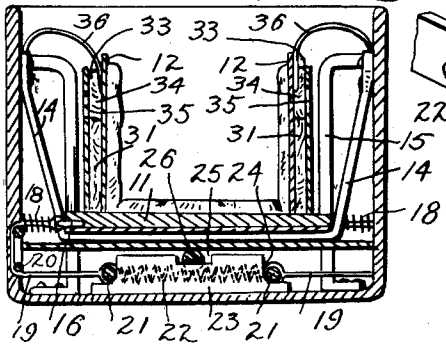
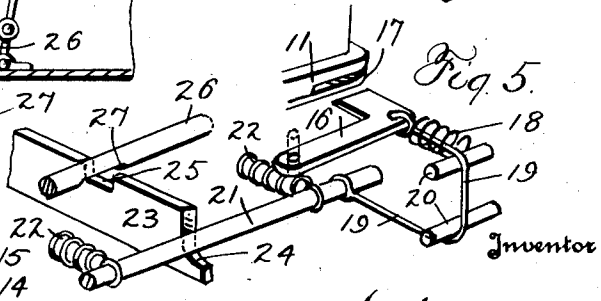


Fig. 5.



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UNITED STATES PATENT OFFICE

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FLYING MACHINE SAFETY DEVICE

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The object of my invention is to provide dependable means for escape from a flying machine when because of a stalled engine or other occurrence which would precipitate the machine to the earth escape or exit therefrom with a parachute, becomes necessary. In particular my object is to provide means requiring the minimum of thought and action on the part of the endangered person, and especially any thought or action on his part in regard to the manipulation of the parachute. My invention contemplates the detachable connection of the seat from the body or fuselage and its positive removal or expulsion from the fuselage along with a proper parachute which will open automatically without any thought or attention on the part of the seat occupant as soon as possible after expulsion from the fuselage and fall or descent of the seat with its occupant begins. The fundamental idea or principle of my invention may be embodied variously and accordingly my invention consists not merely in what is shown in the drawing as an embodiment of my invention and is described hereinafter in this specification, but in whatever is described by or is included within the terms or scope of the appended claims.

In the drawing, I illustrate my invention applied to an airplane in which drawing—

Fig. 1 is a perspective view of an airplane to illustrate my invention, with the seat shown immediately after its expulsion;

Fig. 2 is a like view showing the parachutes distended;

Fig. 3 is a longitudinal section with the seat in position in the fuselage;

Fig. 4 is a cross section on the line 4—4 of Fig. 3;

Fig. 5 is a perspective view of the seat-locking and releasing mechanism.

Describing in detail what is shown in the drawing, within the fuselage 10, is placed any desired number of chairs each including a seat or bottom, 11, with sides, 12, and back, 13, the seat on the underside being engageable by an upward and outward expelling device against the action of which the chair is normally held by a releasable latch device, which remains in chair-locking position until the emergency arises for the expulsion of the chair with its occupant from the machine. Such expelling device may consist as shown, of one or more spring or elastic bands or straps, 14, which extend transversely of the fuselage beneath the seat and with their opposite ends secured to the frame work at a sufficiently high point that when the chair is in normal position, the bands are stretched and placed under tension extending beneath the seat and upwards along the sides of the chair. Upon opposite sides the seat engages vertically extending guide bars, 15, over which the seat slides when the expelling device acts and which serves to position the seat when in normal position for use. Said vertical bars preferably incline upward and rearward so that when the chair is acted upon by the expelling device, the chair will move not only upward but rearward for the purpose of contributing to the clearance of the airplane by the chair when expelled therefrom and thus avoid the danger of the chair on descending becoming fouled with the airplane. Of course, the expelling device should have power enough to assure that the seat and its occupant will be thrown clear of the airplane or flying machine.

The chair is latched in normal position preferably by four pivoted latches 16 one to engage a latch plate, 17, on the underside of the seat at each of the four corners thereof. Each latch is engaged or acted upon by a suitable spring, 18, that holds it in seat-locking position by moving the latch inward. Release of the seat is effected by outward movement of each latch and for that purpose each is connected by a flexible chain or cord, 19, that passes outward from the latch then downward and then over an anti-friction roller, 20, horizontally to a rod or bar, 21, that extends longitudinally of the fuselage below the bottom thereof. There are two such rods, one at each side and to each is connected two of the latches. Said rods are connected near their ends by contractile coil springs, 22, which normally tend to draw them together and to pull upon the cord or chain connected to the latches to move the latches to release them from the chair. Nor-

mally said rods are spread apart against the action of said contractile springs by a flattened cross bar, 23, which at each end has a notch, 24, whose surfaces are engaged by the inner side of each of said rods until said bar is turned flatwise to release said rods and to allow their contractile springs to draw them together. The notched surfaces are cam shape so that after the turning movement of the locking bar has been partially performed as hereinafter described, the pressure of said rods thereagainst will complete the turning of said lock bar and its removal from the path of said rods. At its transverse center said lock bar has a notch, 25, in what is its upper edge when in bar-locking position and slidable crosswise of said bar is a longitudinally extending rod, 26, with a shoulder, 27, in its under side adapted to engage the bottom of said notch and start the turning movement of said lock bar to release the spring-actuated rods. At one end said releasing rod, 26, is slidable in a guide, 28, on the fuselage bottom and at its other end it is pivotally connected to the lower end of a hand lever, 29, that extends upward through a hole in the bottom of the fuselage just forward of the chair so that the chair occupant may grasp the upper end of said hand lever and swing it to accomplish the motions necessary to release the seat from the four latches and permit the expelling device or devices to act on the chair. I preferably connect with said hand lever the rear end of a rod, 30, that extends forward to the front of the airplane or machine in position to be struck and pushed rearward in the event of a collision with another flying machine and thereby automatically to effect the release of the chair and its subsequent expulsion.

The chair as has been explained is equipped with a parachute 31, the suspending cords, 32, of which are suitably attached to the side and rear edges of the chair seat, 11 and which is so associated with the chair in a folded or collapsed state that when the chair is projected out into the air and begins to descend, the parachute will automatically open. As a convenient way of storing the parachute ready for use, I make the side and back walls of the chair hollow or double to provide a storage space, 33, in which the parachute may be stored. I preferably equip the parachute with a supplemental or auxiliary small parachute, 34, which initiates the removal of the main or supporting parachute. Said auxiliary small parachute, 34, is stored in the upper part of the chamber in the side and back walls of the chair and the outer section of the double wall is provided with perforations, 35, to allow the free and ample flow of air into contact with the auxiliary parachute when the chair begins to descend, to at once force the auxiliary parachute out of the chamber and to initiate the opening thereof.

The top of the storage chamber in the chair walls is normally closed by a flap, 36, of leather or fabric which is fastened at its outer edge to an adjacent part of the fuselage and has its free edge tucked or inserted into the upper end of the chamber over the folded parachute therein and is retained with sufficient friction to prevent the accidental outward passage of the parachute although readily moving out of the way under upward pressure from the folded parachute when the escape of the folded parachute is necessary.

The flaps as they pass out act by friction to move the auxiliary parachute out of the space, 23. To provide against possible delayed or slow release of the auxiliary parachute, a cord or rope or other means readily accessible to the chair occupant may be provided to start or help its movement.

Preferably some of the suspending cords of the auxiliary parachute are connected to the chair seat and contribute to the support thereof.

The chair, of course, can be expelled in other directions than upward, and the expelling means can be powerful springs or other agencies.

As I have already said, I do not confine the scope of my invention to the particular construction and relation of parts which appear in that embodiment of my invention which I have selected to illustrate the principle thereof.

What I claim is:—

1. A flying machine having a chair detachably connected therewith and a chair expelling device acting to move the same when detached comprising tension means extending beneath the chair and in contact with the underside thereof transversely of the machine and secured to opposite sides of the latter a substantial distance above the bottom of the chair when the chair is in normal position and lock means to hold the chair in such normal position against the upward pull thereagainst of said tension means comprising oppositely movable, chair-engaging latches, spring means to release the latches and means to restrain action of the spring comprising spaced apart rods and a tiltable plate lying between and oppositely engaging said rods, and means to tilt such plate.

2. A flying machine having a chair detachably connected therewith, a chair expelling device acting to move the same when detached and a collapsed parachute attached to the chair, the chair having a chambered wall within which the collapsed parachute is stored, the chamber opening upward and a cover flap secured to an adjacent surface of the machine with a free edge extending into the chamber over the top portion of the parachute therein.

3. A flying machine having a chair de-

tachably connected therewith, a chair expelling device acting to move the same when detached, and means actuated by a chair occupant for detaching the chair comprising oppositely movable, latch devices engaging the chair bottom on opposite sides, spring means to release such latch devices, means to restrain action of the spring means comprising spaced apart parallel rods and a tiltable plate lying between said rods and with opposite ends engaging the respective rods, a lever within reach of the chair occupant, and operative connections between said lever and said tiltable plate.

4. A flying machine having a chair detachably connected therewith, a chair expelling device acting to move the same when detached, and a collapsed parachute attached to the chair, said chair having hollow walls containing the collapsed parachute.

5. A flying machine having a chair detachably connected therewith and a chair expelling device acting to move the same when detached, a collapsed parachute attached to the chair and an auxiliary parachute connected with the other parachute and serving to remove the latter from the chair, the chair having a chambered wall within which the collapsed parachutes are stored with the auxiliary parachute uppermost and means for access of air to the auxiliary parachute to expel it from the chamber.

6. A flying machine having a chair detachably connected therewith and a chair expelling device acting to move the same when detached, a collapsed parachute attached to the chair, an auxiliary parachute connected with the other parachute and serving to remove the latter from the chair, the chair having a hollow vertical wall open at the top in which the two parachutes are stored in a collapsed state with the auxiliary parachute uppermost and in position first to move upward.

In testimony whereof I hereunto affix my signature.

NICHOLAS P. BRUNO.