July 2, 1946. C. M. VERHAGEN 2,403,250

JETTISONING MEANS FOR THE SLIDING CANOPIES OF AIRPLANE COCKPITS

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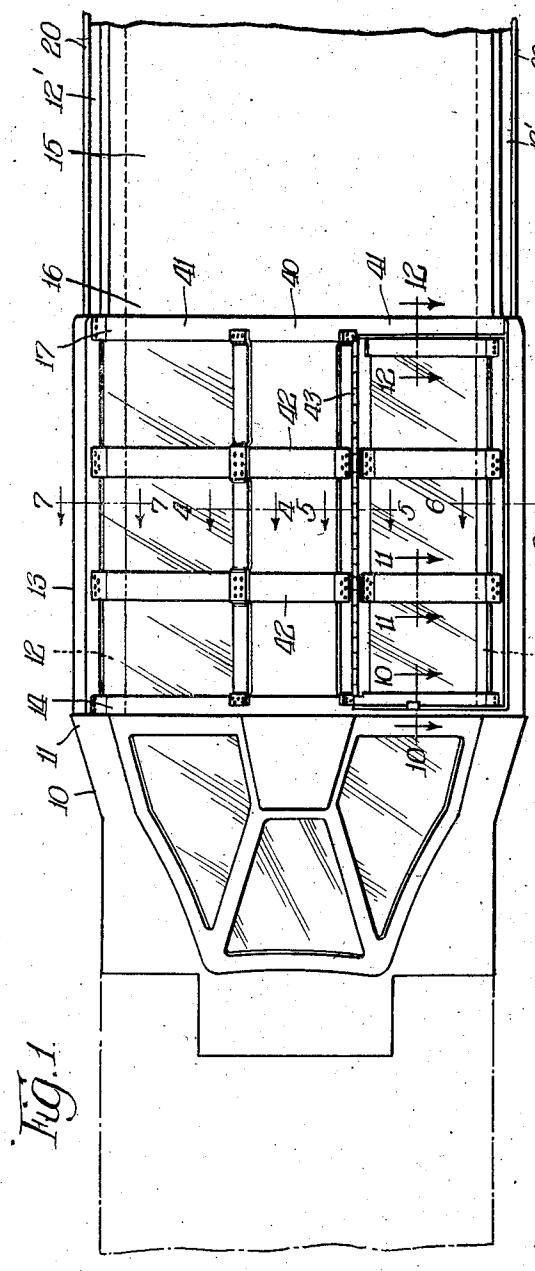


Fig. 1.

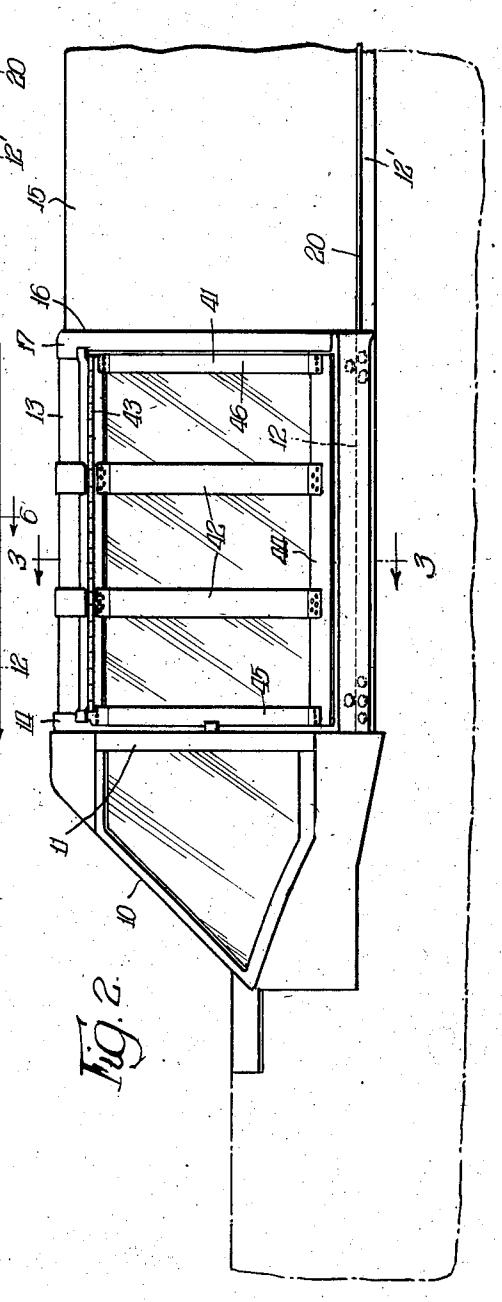


Fig. 2.

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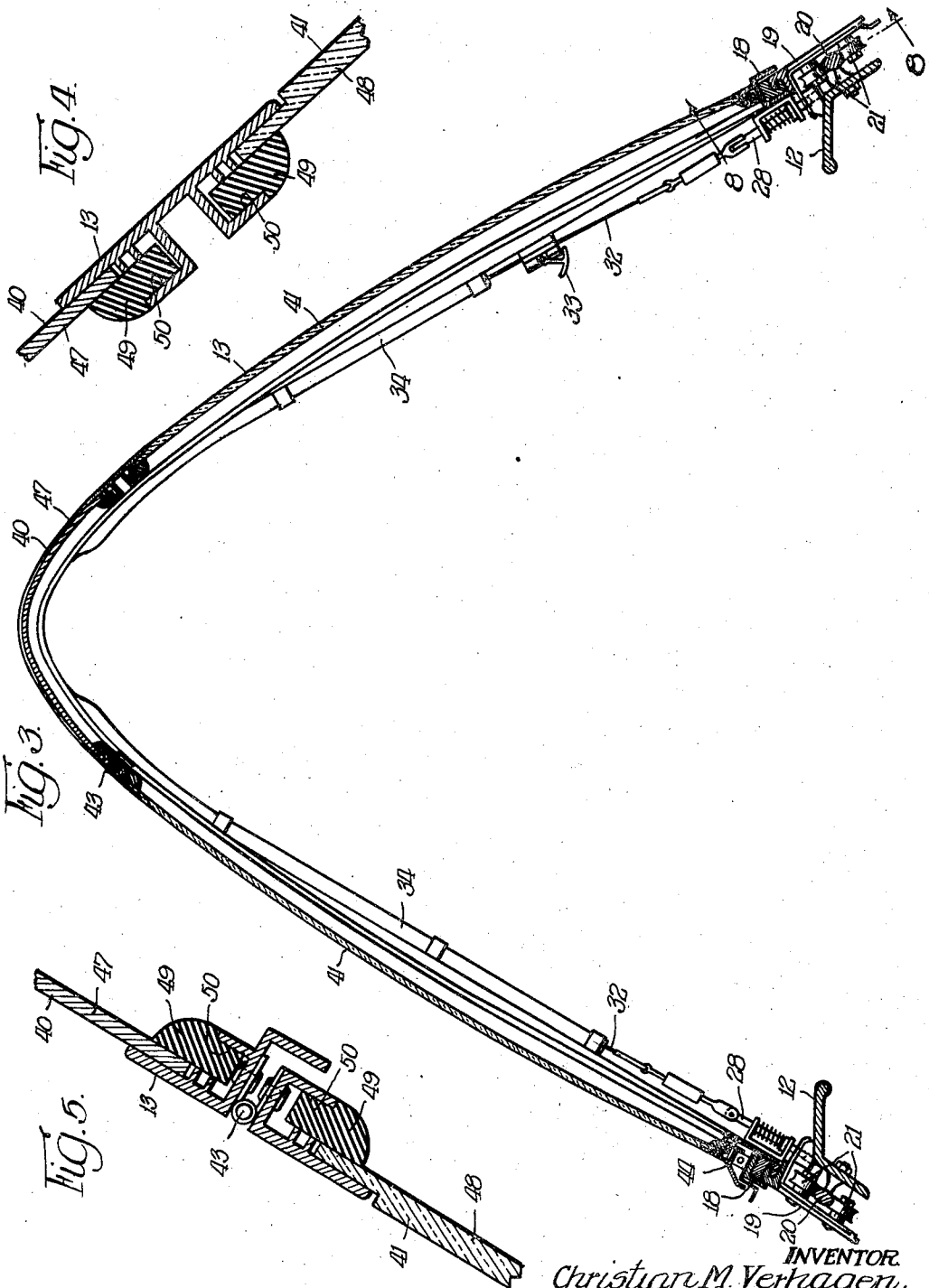


Fig. 4.

Fig. 3.

Fig. 5.

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Fig. 7

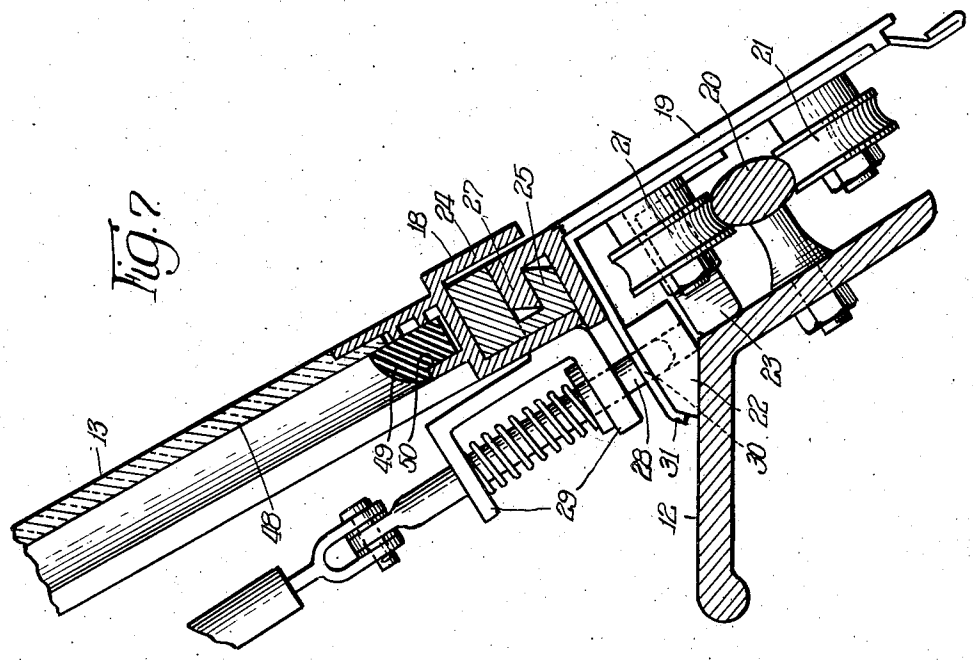
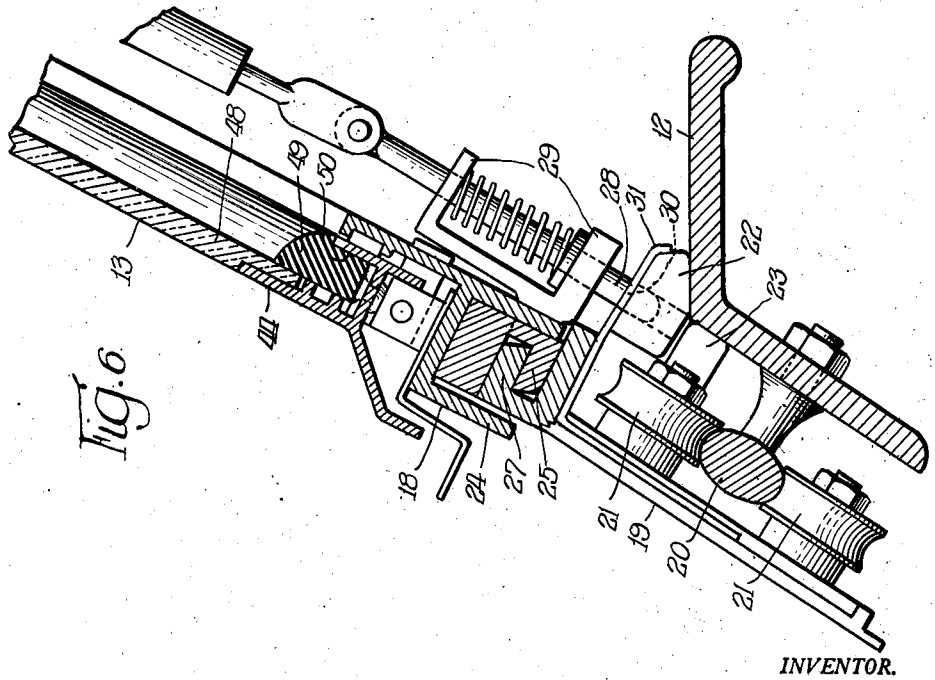


Fig. 6



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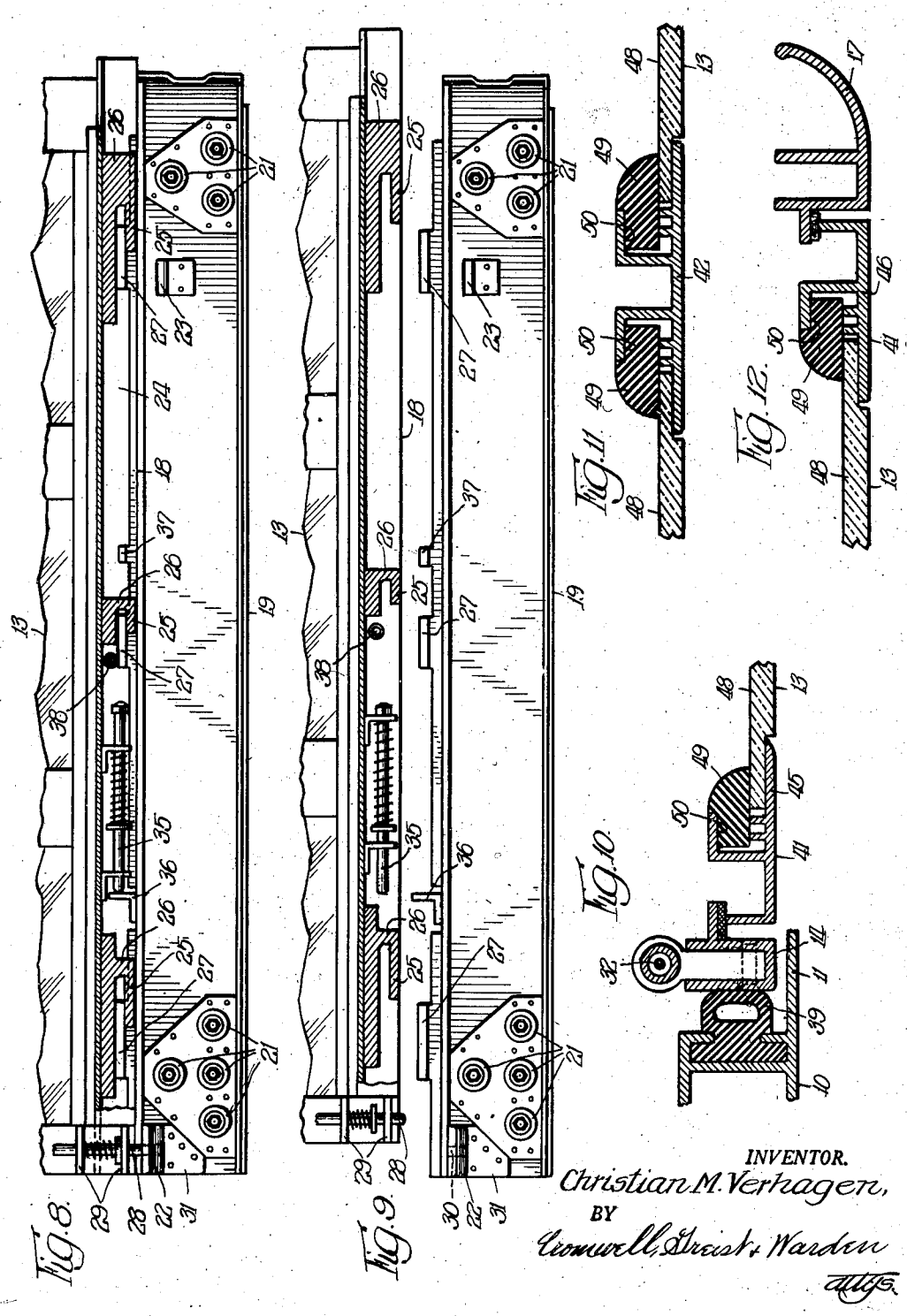


Fig. 8.

Fig. 9.

Fig. 11.

Fig. 12.

Fig. 10.

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JETTISONING MEANS FOR THE SLIDING CANOPIES OF AIRPLANE COCKPITS

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Application December 11, 1942, Serial No. 468,654

2 Claims. (Cl. 244—121)

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This invention has to do with the sliding canopies which are used to enclose the cockpits in fighting and bombing planes, and is particularly concerned with the provision of means for jettisoning the canopy in an emergency when the occupants have to bail out in a hurry and either don't have time, or are unable for some reason, to slide back the canopy.

The principal object of the invention is to provide jettisoning means of the character described which is instantaneous in its action, simple to operate, and absolutely dependable.

Other more specific objects and advantages of the invention will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the novel jettisoning means.

A preferred embodiment of the invention is presented herein by way of exemplification, but it will of course be appreciated that the invention is susceptible of incorporation in other structurally modified forms coming equally within the spirit of the invention and the scope of the appended claims.

In the accompanying drawings:

Fig. 1 is a top view of a sliding canopy equipped with the jettisoning device of the invention;

Fig. 2 is a side view of the canopy;

Fig. 3 is a vertical transverse section through the canopy, taken on the line 3—3 of Fig. 2;

Figs. 4, 5, 6 and 7 are fragmentary sections through different parts of the canopy, taken respectively on the lines 4—4, 5—5, 6—6 and 7—7 of Fig. 1;

Fig. 8 is a longitudinal section through the lower portion of one of the sides of the canopy and its associated carriage, taken on the line 8—8 of Fig. 3;

Fig. 9 is a similar section, showing the canopy in the act of being jettisoned; and

Figs. 10, 11 and 12 are fragmentary sections, taken respectively on the lines 10—10, 11—11 and 12—12 of Fig. 1.

In Figs. 1 and 2 of the drawings the cockpit portion only of the fuselage of a plane is shown. This portion includes a glassed-in windshield 10 which is streamlined back to an arch-shaped rear edge 11, a low-sided cockpit at the rear of the windshield provided with spaced parallel side sills 12, a glassed-in canopy 13 of the same general transverse curvature as the rear edge 11 of the windshield, which canopy is slidably mounted on the side sills 12 with its front edge 14 normally telescoped a short distance within the rear edge 11 of the windshield, and a hood 15 of the same

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general transverse curvature as the canopy 13, which hood is telescoped at its front edge 16 by the rear edge 17 of the canopy and is set in from the sides of the fuselage to expose rearward continuations 12' of the side sills 12, on which continuations the canopy 13 is adapted to slide back over the hood 15.

The canopy 13 is provided along its lower laterally inclined margins with correspondingly inclined side rails 18. The side rails 18 are detachably secured to correspondingly inclined side bars 19, and the latter are in turn slidably mounted on the side sills 12. The sills 12 are provided with tracks 20 which extend rearwardly the full length of the sills 12 and their continuations 12', and the bars 19 are equipped with front and rear sets of anti-friction rollers 21 which engage with the upper and lower surfaces of the tracks 20. The bars 19 are also equipped with blocks 22 and 23 of hard fiber or other suitable anti-friction material which slidingly engage with the top and side surfaces respectively of the sills 12 whereby to prevent the bars 199 from varying from their laterally inclined positions and possibly binding with the overlying rails 18.

From the description thus far it will be understood that the canopy 13 is freely slidable and can be slid either forwardly to cover the cockpit or rearwardly to uncover the cockpit, as desired. A hand crank device (not shown) connected with one of the bars 19 can be used to move the canopy. In its forwardly slid position—in which the front edge 14 of the canopy is telescoped a short distance within the rear edge 11 of the windshield 10—the canopy is held against rearward movement by a latching device (not shown) acting between one of the bars 19 and one of the sills 12. These two devices are commonly employed in connection with sliding canopies and do not form any part of the present invention.

The invention resides in the novel means hereinafter described for instantly and completely freeing the canopy from the cockpit while the plane is in full flight.

The side rails 18 of the canopy are provided on their undersides with downwardly opening channels 24 which contain a plurality of downwardly and laterally extending hook-shaped formations 25. The formations 25 are spaced apart longitudinally of the side rails and are closed off at their rear ends 26. These formations interlock vertically and laterally with complementary hook-shaped formations 27 provided on the upper surfaces of the side bars 19, with the rear ends of one or more of the formations 27 longitudinally

abutting the closed rear ends 26 of the formations 25.

The formations 25 and 27 will secure the side rails 18 to the side bars 19 only so long as the formations remain in interlocked engagement with each other. Should the side rails 18, which constitute the lower marginal edges of the canopy 13, be shifted rearwardly for but a short distance with respect to the side bars 19—say about an inch—the formations 25 will become unhooked from the formations 27 and the side rails and canopy will be free to fly off into space. This release is normally prevented by two downwardly spring-pressed locking pins 28. The pins 28 are reciprocably mounted in brackets 29 on the front ends of the side rails 18 and project downwardly through holes 30 in brackets 31 attached to the front ends of the side bars 19.

The locking pins 28 are connected to flexible wire cables 32 which are in turn connected to an operating handle 33. The handle 33 is mounted on the inside of the canopy, at a readily accessible location about mid height of one of the sides, and the cable 32 leading from the locking pin at the opposite side is led to the handle 33 through an arched conduit 34. When the handle 33 is pulled, the pins 28 carried by the side rails 18 will be withdrawn from their locked engagement with the side bars 19. The side rails 18 are provided, within the channels 24, with forwardly spring-pressed plungers 35 which exert forward pressure on brackets 36 mounted on the upper surfaces of the side bars 19. As soon as the locking pins 28 are withdrawn, the plungers 35 will force the side rails 18, with the canopy 13, rearwardly far enough to permit the formations 25 to disengage from the formations 27. The extent to which the plungers 35 will move the side rails 18 rearwardly is limited by stops 37 on the side bars 19 in the path of movement of the rear ends 26 of certain of the formations 25. During this rearward movement small anti-friction rollers 38 carried by the side rails 18 ride on the upper surfaces of certain of the formations 27 to relieve friction and eliminate any tendency to stick or bind.

From the foregoing it will be understood that as soon as the handle 33 is manipulated to trip the pins 28, the side rails 18 will be shifted rearwardly by the spring-pressed plungers 35 far enough to unhook the formations 25 from the formations 27 and also far enough to withdraw the front edge 14 of the canopy from within the telescoping rear edge 11 of the windshield. The side rails 18, with the canopy, will immediately separate from the side bars 19 and fly off into space under the action of the air stream thereon, leaving the upper portion of the cockpit entirely open.

When the canopy 13 is in its closed position, the front edge 14 of the same is sealed and cushioned within the front edge 11 of the windshield by a resiliently compressible weather strip 39 of rubber or other suitable material. The strip 39 is secured to the inner side of the rear edge 11, in a position where it will be engaged and compressed by the front edge 14 when the canopy is in its fully closed position.

The canopy 13 is characterized by a roof section 40 which is opaque and by side sections 41 which are transparent. All three sections are preferably reinforced by transversely extending

strips 42. One of the side sections 41 is hinged along its upper edge at 43, whereby to provide an escape hatch for the occupants of the cockpit should the plane turn over on its back on the ground and the canopy as a whole be jammed and prevented from being slid back in the normal way. The hinged section 41 is normally held in its closed position, with its bottom rail 44 positioned against the adjacent side rail 18, and with its front and rear end rails 45 and 46 secured against the members forming the front and rear edges 14 and 17 of the canopy, by any suitable latching means (not shown).

The panels 47 of sheet metal or other material which form the roof section 40 of the canopy, and the panes 48 of safety glass or other transparent material which form the side sections 41, are all securely held in their marginal frame members by readily removable glazing strips 49 of rubber or other resiliently compressible material inserted under compression in grooves 50 provided in such frame members.

The jettisoning means is of course not limited in its application to a glassed-in canopy located immediately behind a windshield, but may be employed to advantage in connection with other enclosures at different locations.

I claim:

1. In a plane fuselage, the combination with an opening in the top of the fuselage, and an arched canopy normally covering said opening, of side rails at the lower edges of the sides of the canopy rigidly connected with the latter, carriages beneath the side rails provided with track rollers, tracks along the sides of the opening in the fuselage engaged by the rollers for permitting the carriages with the side rails and canopy to be slid back endwise of the tracks to uncover the opening, interengaging formations on the side rails and carriages normally holding the same hooked together, which formations disengage upon the side rails being shifted endwise with respect to the carriages a short distance, spring means tending to effect such endwise shifting movement, locking means normally rendering the spring means inoperative, and control means for releasing the locking means, whereby to jettison the canopy.

2. In a plane fuselage, the combination with an opening in the fuselage, and a canopy normally covering said opening with a portion of the canopy telescoped within the fuselage at the front end of the opening, of side rails at the sides of the canopy rigidly connected with the latter, carriages adjacent the side rails, tracks along the sides of the opening in the fuselage for permitting the carriages with the side rails and canopy to be slid back endwise of the tracks to uncover the opening, interengaging formations on the side rails and carriages normally holding the same hooked together, which formations disengage upon the side rails being shifted endwise with respect to the carriages far enough for the canopy to clear the front end of the opening in the fuselage, means tending to effect such endwise shifting movement, locking means normally rendering said last mentioned means inoperative, and control means for releasing the locking means, whereby to jettison the canopy.

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