Aug. 10, 1954 C. C. LARRY 2,686,023

AIRCRAFT SKI

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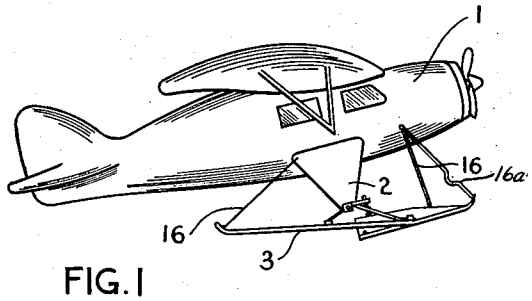


FIG. 1

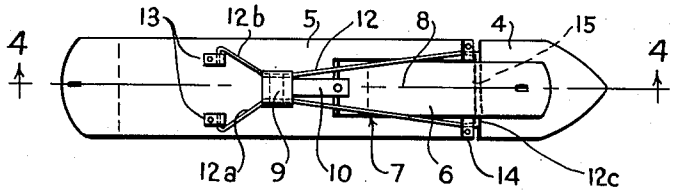


FIG. 2

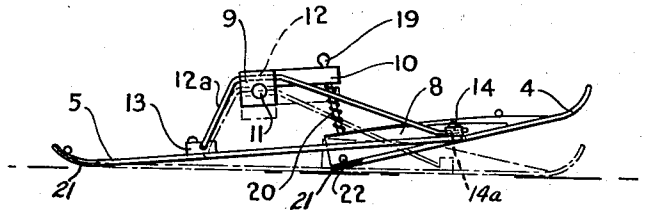


FIG. 3

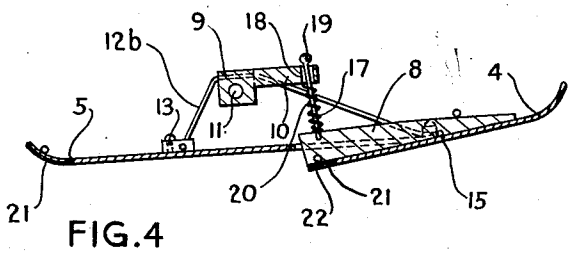


FIG. 4

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AIRCRAFT SKI

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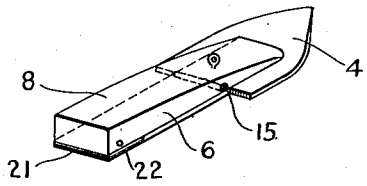


FIG.5

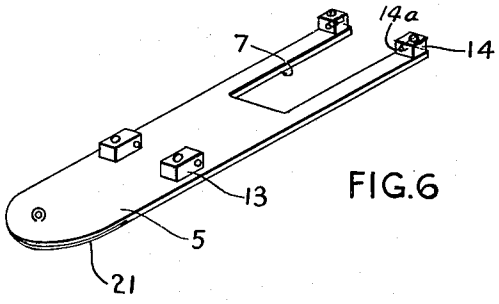


FIG.6

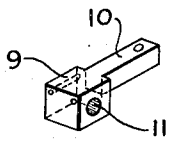


FIG.7

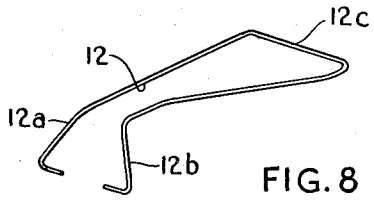


FIG.8

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AIRCRAFT SKI

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10 Claims. (Cl. 244—108)

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This invention relates to improvements in an aircraft ski and appertains particularly to a novel articulated ski and associated pedestal structure having marked advantages in use on snow and ice surfaces.

An object of the invention is the provision of an articulated ski comprising hingedly related forward and rear sections with resilient means normally tending to tilt the forward section.

A further object of the invention is to provide an articulated aircraft ski in which the hinging action of the sections is responsive to the application of engine power or the travel of the aircraft along the surface.

A further object of the invention is to provide an articulated ski with a spring-hinged section that causes the front of the ski to ride up in deep snow take offs and to allow air space under the runner to destroy surface suction in wet or sticky snow.

A further object of the invention is to provide an aircraft ski that lifts clear of the supporting surface when "at rest," hinging up on the tail parts of its articulated sections, thus preventing the ski from freezing down and wherein the articulating action of the sections will act to clear off sleet, ice or slush forming in the connecting joint between the sections.

A further object of the invention is to provide an articulated ski that will facilitate turning of the aircraft by pivoting on the depressed tail end of the front section of the inside ski while the outside ski flattens out under momentum.

A still further object of the invention is the provision of an aircraft ski and pedestal of the nature and for the purposes described that is useable with standard aircraft construction and rigging, will provide smoother shock-absorbing riding, lessen stress and strain on the aircraft, promote longer under-carriage life, and generally provide a safe, efficient and useful winter landing gear element.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings—

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Figure 1 is a side elevation of a small airplane equipped with the invention;

Figure 2 is an enlarged plan view of one of the skis;

Figures 3 and 4 are a side elevation and longitudinal section thereof, respectively;

Figures 5 and 6 are perspective views of the front and rear ski sections respectively;

Figure 7 is a perspective view of the pedestal block; and

Figure 8 is a perspective view of the pedestal ski bracket.

The present airplane ski and pedestal is shown and described as applied to a small cabin plane wherein the pedestal assembly is simple, the shock strut light and standard aircraft shock cord is used in the rigging, and preferably the ski itself is of all-metal construction. In larger aircraft the fittings would be more complicated and the ski undergo some alterations but its general design would remain the same as regards the nature and the relation of its principal parts.

In Figure 1 the small, light aircraft 1 is equipped with the usual landing gear struts 2 having an axle shaft projecting at each side adapted to interchangeably receive wheels, pontoons or skis.

The instant ski structure 3 includes a two-part metal ski having a front section 4 hingedly connected to the rear ski section 5 so that it may hinge vertically. The trailing edge of the front section 4 does not lie in a direct transverse line but has a centrally disposed integral box section formed as an elongated rectangular stem portion 6 that extends rearwardly into the forward part of the rear ski section 5, being received with reasonably close tolerance in a notch or well 7 that opens to the leading edge of such rear ski section. Added rigidity is given the front section 4 by a thickened dome top 8 that runs from the back of the stem to a point substantially in advance of the hinge connection.

The pedestal for each ski consists of a block 9 with a forwardly extending tongue 10, the block proper having a transverse bore 11 to removably fit on the landing gear axle shaft, and a spider brace 12 comprising a laterally spaced pair of parallel rods 12*a* and 12*b* that pass horizontally and longitudinally through and are securely held by the block 9 and at both ends diverge outwardly and decline to connect with the ski 3. Specifically, the rear ends of the rods 12*a* and 12*b* decline quite sharply and have their ends bent inwardly into horizontal alignment and are terminally secured in the attaching brackets 13 on

the rear ski section 5; the forward ends of the spider rods decline less sharply and are securely fastened to the front edge of the rear ski section 5, near opposite sides, by passing through opening 14a in attaching brackets 14; and in the present instance the front ends of these spider side rods are joined by an integral intermediate portion 12c that extends transversely of the ski between the forward sides of the brackets 14 and passes through a perforation 15 in the thickened dome top of the forward ski section 4 to serve as the pivot of the hinge connection between the articulated front and rear ski sections.

Thus assembled, the whole ski is free to pivot on the usual landing gear axle shaft of the aircraft within the limits allowed by the usual shock cords 16, shown in Figure 1, stretched between the aeroplane fuselage and the forward part of the front ski section and the tail end of the rear ski section respectively. There is, however, a special resilient cushion for the front ski section designed to cause it to hinge upwardly at the front to aid it rising up in deep snow and for the other purposes set forth hereinbefore. Such spring or cushion device acts against the combined weight and thrust of the aircraft, having greater strength than the weight of the aircraft but less than the combined weight and thrust so that when the craft is at rest the front ski section teeters to carry the load on the tail end of its stem and the tail end of the rear ski section, as clearly shown in Figure 3. The resilient means employed in this simple embodiment consists of a post 17 secured to the top of the front ski section near the tail end thereof passing upwardly through a perforation 18 in the forward end of the pedestal block 9 and provided with an enlarged head 19 on its upper end to act as a "stop" to limit its downward movement, and a coil spring 20 compressed between the tail 6 of front ski section and the underside of the pedestal block 9.

For added safety, a check cable 16a can run, for instance, from the fuselage to the front part of the ski to serve in the event of failure to the spring 20 or the shock cord 16, or means may be employed to limit the upward push of the cushion post 17.

Additionally, in view of the greater wear on the bottom surface of the tail 6 of the front section and the trailing end of the rear ski section, replaceable wear plates 21 may be employed in these areas.

To revert this articulated ski to normal use substantially as a rigid, one-piece ski, the resilient coil spring 20 may be depressed and the hinged front ski section locked in flat position as by running a cross bar through a horizontal transverse bore 22 in the tail of the stem 6 just above the normal level of the ski and allowing it to project out over the sides of the rear ski section 5 on either sides of the well 7 so that it would thus take the thrust of the compressed spring.

The preferred form shown and described in this application is obviously merely one adaptation of the invention to a particular type of light aircraft and the invention both as regards the instant ski construction, the pedestal assembly and the incidental rigging would be considerably varied or modified to suit the needs of larger or widely different types of aeroplanes.

From the foregoing description taken in connection with the accompanying drawings, it will be manifest that an aircraft ski is provided that will fulfil all the necessary requirements of such a device, but as many changes could be made in the above description and many apparently widely different embodiments of the invention may be constructed within the scope of the appended claims, without departing from the spirit or scope thereof, it is intended that all matters contained in the said accompanying specification and drawings shall be interpreted as illustrative and not in a limitative or restrictive sense.

Having thus described the invention, what is claimed as new is:

1. For aircraft landing gear, an articulated ski comprising hingedly connected front and rear sections, the leading edge of said rear section having a central well-like notch therein and said front section having a trailing stem receivable therein.

2. An aircraft landing ski comprising articulated front and rear sections as defined in claim 1 and a pedestal assembly connecting at its opposite ends to said front and rear ski sections respectively.

3. For an aircraft having a landing gear strut and axle shaft, an articulated ski comprising hingeably related front and rear sections, said front section having a centrally disposed rearwardly extending box-like stem and said rear section having a well-like notch at its forward end in which said stem is receivable, a pedestal on said articulated ski rotatably mounted on said axle shaft, and resilient means interposed between said front section of said ski and said pedestal to cause the nose thereof to hinge upwards.

4. For an aircraft having a landing gear strut and axle shaft, an articulated ski comprising hingeably related front and rear sections, said front section having a trailing centrally disposed stem and said rear section having a well in its forward end for the reception of said stem with reasonably close tolerance, a ski-surmounting pedestal rotatably mounted on said axle shaft and shock cords on opposite ends of said ski for attachment to the aircraft.

5. For an aircraft having a landing gear strut and axle shaft, an articulated ski comprising hingeably related front and rear sections, said front section having a trailing centrally disposed stem and said rear section having a well in its forward end for the reception of said stem with reasonably close tolerance, a ski-surmounting pedestal rotatably mounted on said axle shaft and resilient means compressed between said pedestal and the trailing stem of said front section to cause the nose of said front section to hinge upwards.

6. For an aircraft having a landing gear strut and axle shaft, an articulated ski comprising hingeably related front and rear sections, said front section having a trailing centrally disposed stem and said rear section having a well in its forward end for the reception of said stem with reasonably close tolerance, a ski-surmounting pedestal rotatably mounted on said axle shaft and having a forwardly extending tongue, and a spring compressed between said tongue and the rear end of the trailing stem of said front section tending to teeter said hingedly related front section against the weight and thrust of the aircraft.

7. For an aircraft having a landing gear strut and axle shaft, an articulated ski comprising hingeably related front and rear sections, said front section having a trailing centrally disposed stem with a thickened dome-like top that continues forwardly of the stem and said rear section having a well in its forward end for the reception of said stem with reasonably close tol-

erance, a ski-surmounting pedestal secured at opposite ends to the front and rear of said rear ski section and including at the forward end a transversely disposed horizontal rod that passes through the thickened dome-like top of the front ski section and serves as the pivot on which said front ski section hinges, said pedestal being rotatably attachable to said axle shaft and resilient means interposed between said pedestal and said front ski section.

8. The combination with the structure set forth in claim 7, wherein said resilient means is a spring compressed between said pedestal and the rear end of the trailing stem of said front ski section, and means to limit the teetering of said front ski section.

9. The combination with the structure set forth in claim 1, of resilient means interposed between the aircraft and the ski and acting downwards on the trailing stem of said front section to cause the nose thereof to hinge upwards against the weight and thrust of the aircraft and of greater strength than the weight alone of the aircraft but less than the combined weight and thrust.

10. The combination with the structure set forth in claim 3, of replaceable wear plates on the bottom of said articulated ski in the immediate areas only that remain on the ground when the nose of the front section is hinged upwards, namely on said rear ski section across the back and on said front ski section across the trailing end of said stem.

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