

Aug. 23, 1932.

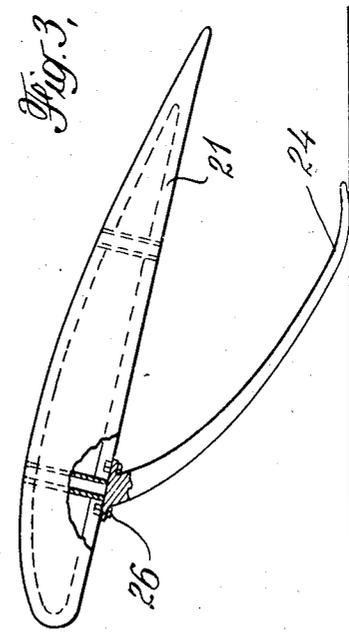
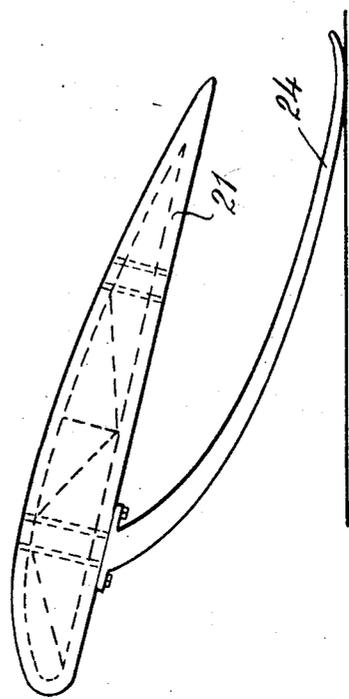
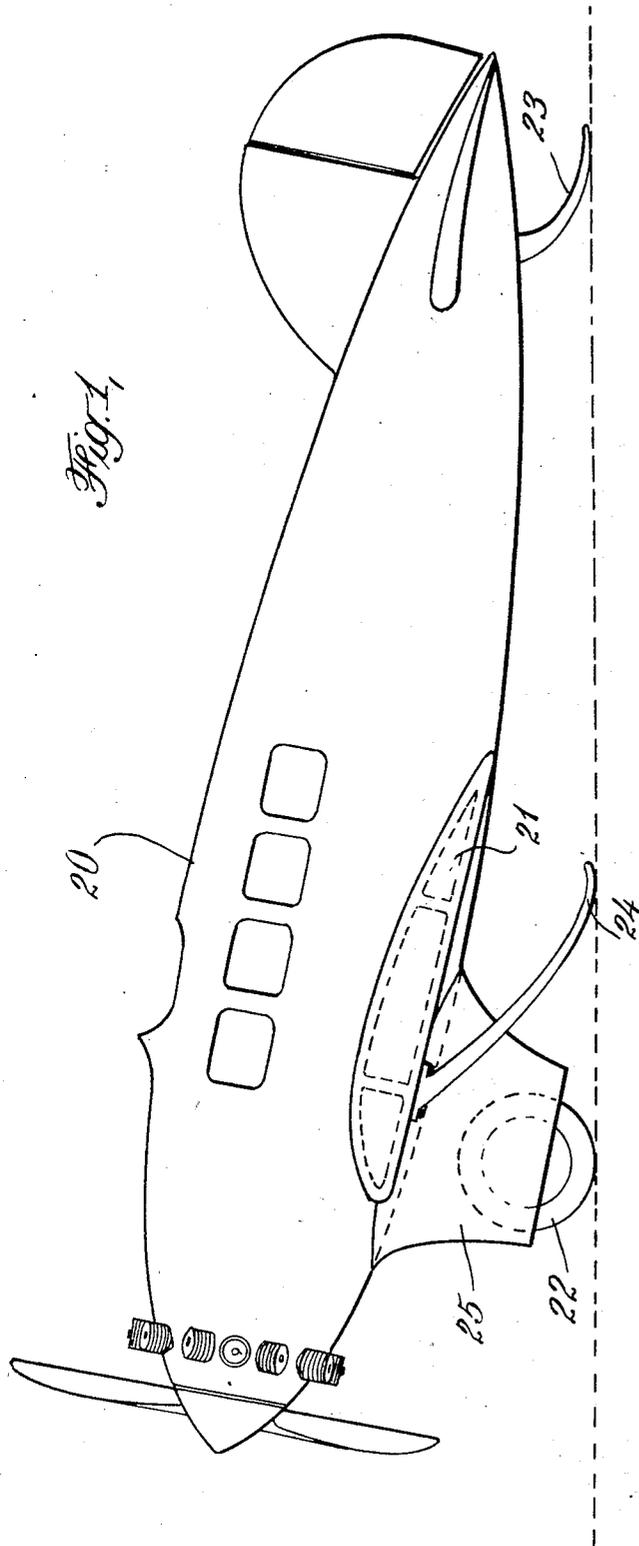
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1,872,811

AEROPLANE

Filed Feb. 12, 1929

3 Sheets-Sheet 1



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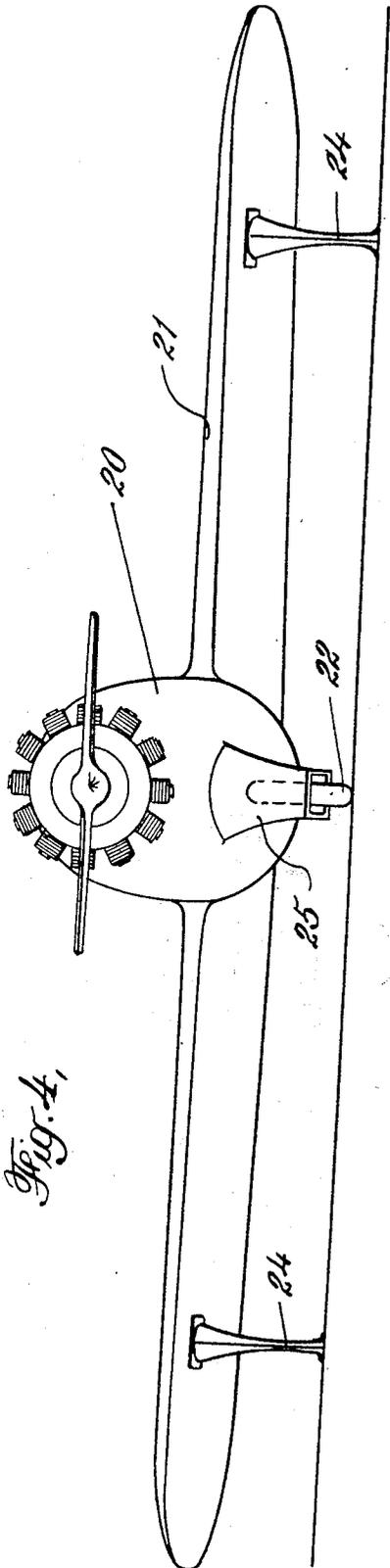


Fig. 4,

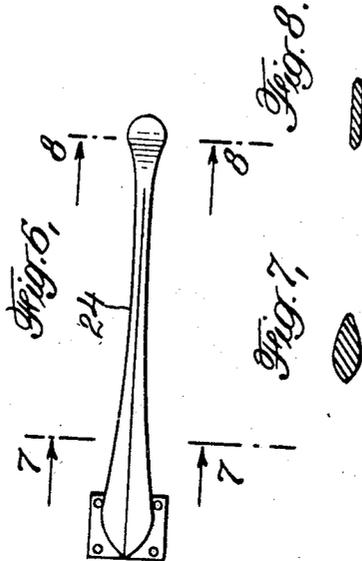
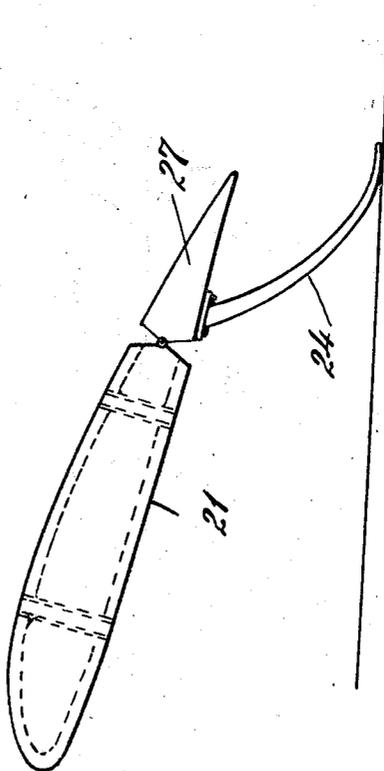


Fig. 5,



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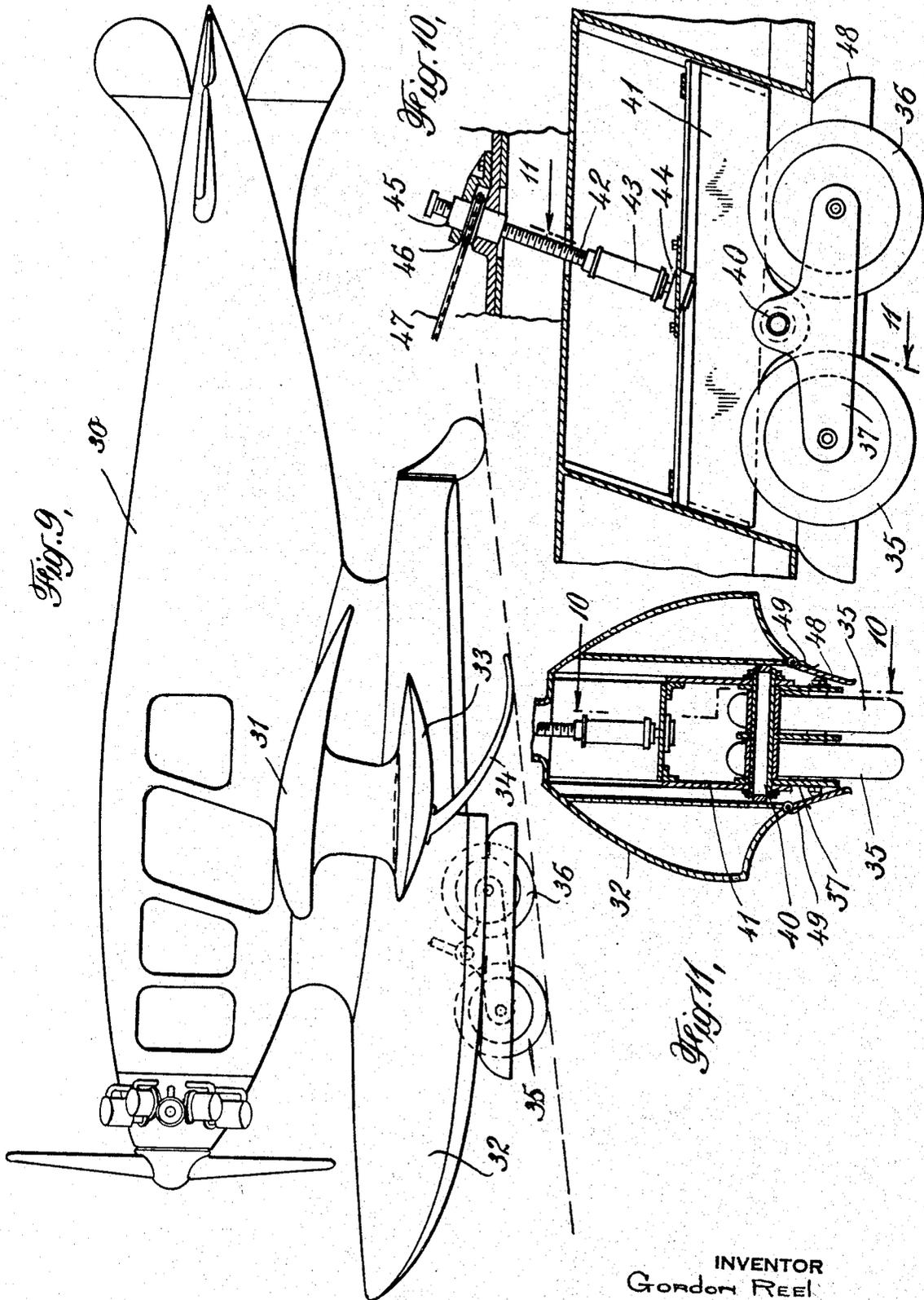
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3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

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## AEROPLANE

Application filed February 12, 1929. Serial No. 339,309.

This invention relates to aeroplanes and has for an object the provision of an improved aeroplane structure which provides for the elimination of many of the usual structural features of aeroplanes which cause resistance to movement. More particularly, the invention contemplates the provision of an aeroplane structure provided with improved landing gear.

10 The present invention provides for the elimination of the usual wide base landing gear with the associated struts and braces and exposed wheels which cause great resistance to the movement of the plane and result in  
 15 a considerable reduction in efficiency. The present invention utilizes a relatively narrow base landing means in substantially the position of the usual wheel means. Any desirable type of tail skid may be used in conjunction with the landing means. The landing means is capable of supporting the full weight of the plane, but of insufficient width to normally maintain the plane in a laterally balanced or stable position while at rest  
 25 upon the ground. Thus, when a tail skid is used in conjunction with the landing means, the aeroplane is spaced from and supported above the landing surface by supporting means which, in effect, contact with the landing surface at only two points disposed in  
 30 a line extending centrally and longitudinally of the central body of the aeroplane. Wing skids are provided for use in conjunction with the centrally disposed supporting means. The invention is applicable to land and amphibian aeroplanes.

I prefer to provide two wing skids, one disposed on each side of the supporting means and rigidly attached to a wing. The skids  
 40 may be suitably spaced from the supporting member to provide the proper balance or stability. The skids are streamline and extend downwardly to the land or ground plane which includes the contact points of the supporting means and tail skid. The skids function simultaneously to balance the aeroplane on the supporting means.

Land planes embodying the invention may be provided with single centrally disposed  
 50 wheels or a plurality of closely adjacent

wheels positioned beneath the central body portions. The wheels may be adjustably mounted within the streamline central body portions, or in casings provided for that purpose, in such a manner that they may be projected downwardly for landing purposes and withdrawn for flight purposes to eliminate air resistance. The wheels may be rigidly mounted beneath the central body portions and substantially entirely encased in streamline housings. The wing skids may project rearwardly from their points of attachment to the wings to any desired extent.

Amphibian planes embodying the invention may be provided with adjustable or retractable supporting means associated with centrally disposed pontoons. Wing tip floats may be provided and wing skids may be attached to the wing floats or directly to the wings.

The wing skids preferably extend downwardly a sufficient distance that, when the aeroplane on which they are mounted is at rest upon the landing surface, upward pressure is exerted through both skids. Thus, in the preferred construction, a line containing the landing surface contact points of the wing skids would normally be disposed below a line containing the landing surface contact points of the central supporting means, for instance, if the entire aeroplane were spaced above the landing surface and the supporting means were extended to their normal landing positions.

The invention will be better understood from a consideration of the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevation of a land plane embodying the invention;

Fig. 2 is an end elevation of a wing having a skid attached thereto and showing a method of attaching the skid to the wing;

Fig. 3 is similar to Fig. 2 but shows a skid extending rearwardly to point behind the wing;

Fig. 4 is a front elevation of a land plane embodying the invention;

Fig. 5 is an end elevation of a wing showing a skid attached to the aileron;

Fig. 6 is a plan of a wing skid;

Fig. 7 is a section taken substantially along line 7—7 of Fig. 6;

Fig. 8 is a section taken substantially along line 8—8 of Fig. 6;

Fig. 9 is a side elevation of an amphibian plane embodying the invention;

Fig. 10 is a sectional elevation taken substantially along line 10—10 of Fig. 11, and showing a tandem arrangement of retractable landing wheels; and

Fig. 11 is a section substantially along line 11—11 of Fig. 10.

In Figs. 1 and 4 of the drawings, there is shown a monoplane adapted only for land purposes and comprising a central body portion 20 and a wing 21 extending transversely of the longitudinal axis of the central body. A single centrally disposed wheel 22 and a tail skid 23 are provided for supporting the machine in spaced relation to the ground. Wing skids 24 are rigidly attached to the wing at points between the central body and the ends of the wing and provide balancing means or stabilizers for maintaining the machine in a proper landing or taking off position. The wing skids extend downwardly to or below the landing plane containing the contact points of the tail skid and wheel, and function simultaneously to balance the machine or the wheel and tail skid. The wing skids are preferably formed of a resilient material such, for example, as wood, or hollow metal, and they are preferably streamline, terminating some distance rearwardly of their points of attachment to the wing to provide further resiliency.

Figs. 7 and 8 show sections of the wing skids. The upper portion of each skid has a streamline contour as shown in Fig. 7, and the lower end portion is broadened to provide a relatively large bearing surface.

The major portion of the wheel 22 is enclosed in a streamline casing 25 and it may be either rigidly or adjustably mounted therein. The provision of a single wheel permits the use of a relatively small number of struts and braces which may be enclosed in a relatively small streamline casing.

The wing skids may be attached to the wings in any suitable manner. Fig. 2 shows one method of attachment in which the skid is bolted as at 26 to one of the spars comprising the framework.

Figs. 2 and 3 show skids of different lengths which may be used to provide varying resiliency or contact of the skids with the landing surface at different points.

Fig. 5 shows a skid 24 rigidly attached to an aileron 27 which forms a part of the wing structure 21. This arrangement permits some degree of manipulation of the skids and permits the skids to automatically function harmoniously with the ailerons.

An amphibian aeroplane embodying the

invention may comprise a central body portion 30, a transversely extending wing 31, a central pontoon 32 and wing floats 33 (Fig. 9). Wing skids 34 may be rigidly attached directly to the wing or to the wing floats. A single central wheel such as shown in Figs. 1 and 4, and a tail skid may be used in conjunction with the wing skids for alighting upon land. Two or more closely adjacent wheels mounted for rotation about the same axis may be used, and single wheels or units comprising a plurality of wheels may be mounted in tandem.

The amphibian aeroplane shown in the drawings is provided with a retractable landing unit comprising four wheels, two wheels abreast and in tandem. The wheels 35 are mounted for rotation about a single axis. The wheels 36 are also mounted for rotation about a single axis, and disposed directly behind the wheels 35. The wheels 35 and 36 are mounted in a frame 37 which is pivotally supported at 40 in an adjustable support 41. The support 41 is slidably mounted within a downwardly opening pocket in the pontoon 32, suitable guide members and grooves being provided to direct the movement of the support.

A screw 42 provided with a shock absorber 43 is attached by a swivel connection at 44 to the support 41. The screw 42 extends substantially vertically through an internally threaded bushing 45, rotatably mounted and locked against vertical movement in the internal framework of the aeroplane. A gear 46 is rigidly mounted on the bushing 45 and connected by means of a chain 47 with manipulating means (not shown) in the pilot's cockpit. The arrangement shown and described provides for the extension and retraction of the landing wheels. Door members 48 are provided for closing the downwardly opening pocket in the pontoon. Springs 49 serve to maintain the doors 48 in their closed positions when the wheels are withdrawn, and to permit the doors to be opened by the pressure exerted by the wheels as they are being extended.

The landing wheel arrangement shown in connection with the amphibian plane may also be applied to land planes.

I claim:

1. A flying machine comprising a central body, a wing extending transversely of the longitudinal axis of said body, a wheel for supporting said machine, a tail skid, ailerons, and skid members rigidly attached to said ailerons and functioning automatically in harmony with said ailerons to control the lateral stability of the machine.

2. An amphibian aeroplane comprising a central pontoon having a downwardly opening pocket therein, a wing extending transversely of the longitudinal axis of said pontoon, a plurality of wheels mounted in tan-

dem within said pocket and movable from in-  
operative positions within said pocket to  
operative positions in which portions there-  
of project below the bottom of said pontoon,  
5 wing floats for balancing the aeroplane on the  
central pontoon on water, and wing skids  
rigidly attached to said wing floats and  
adapted to act simultaneously to balance the  
aeroplane on the wheels on land.

10 3. A flying-machine comprising a central  
body having a downwardly opening pocket  
disposed substantially centrally of the longi-  
tudinal side edges thereof, a plurality of  
wheels mounted in tandem within said  
15 pocket and movable from inoperative posi-  
tions within said pocket to operative positions  
in which portions thereof project from said  
pocket, a wing extending transversely of the  
longitudinal axis of said body, and wing  
20 skids for balancing said machine on said  
wheels.

In testimony whereof I affix my signature.

GORDON REEL.

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