Feb. 10, 1942. J. HOJNOWSKI 2,272,522

AIRPLANE

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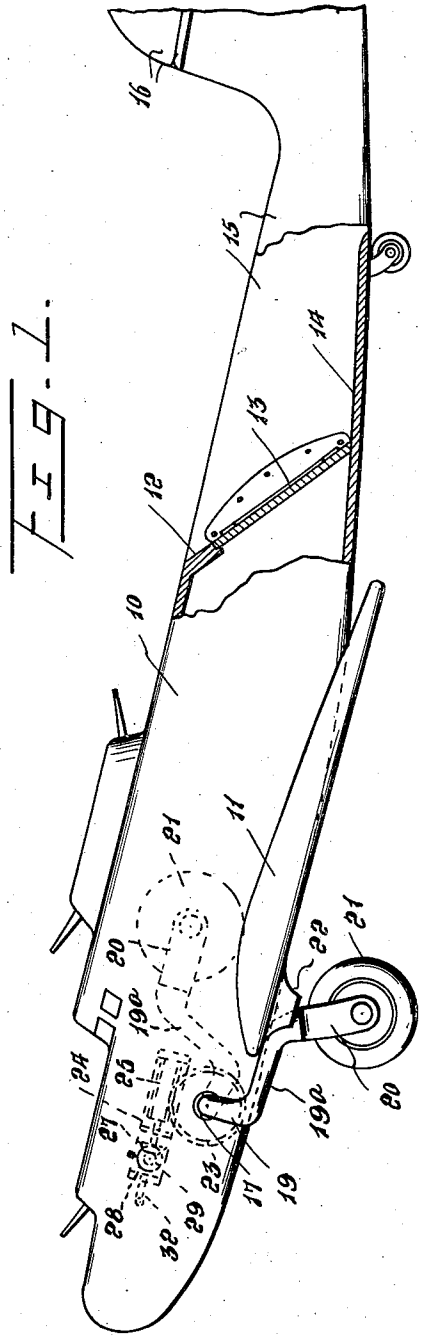


FIG. 1.

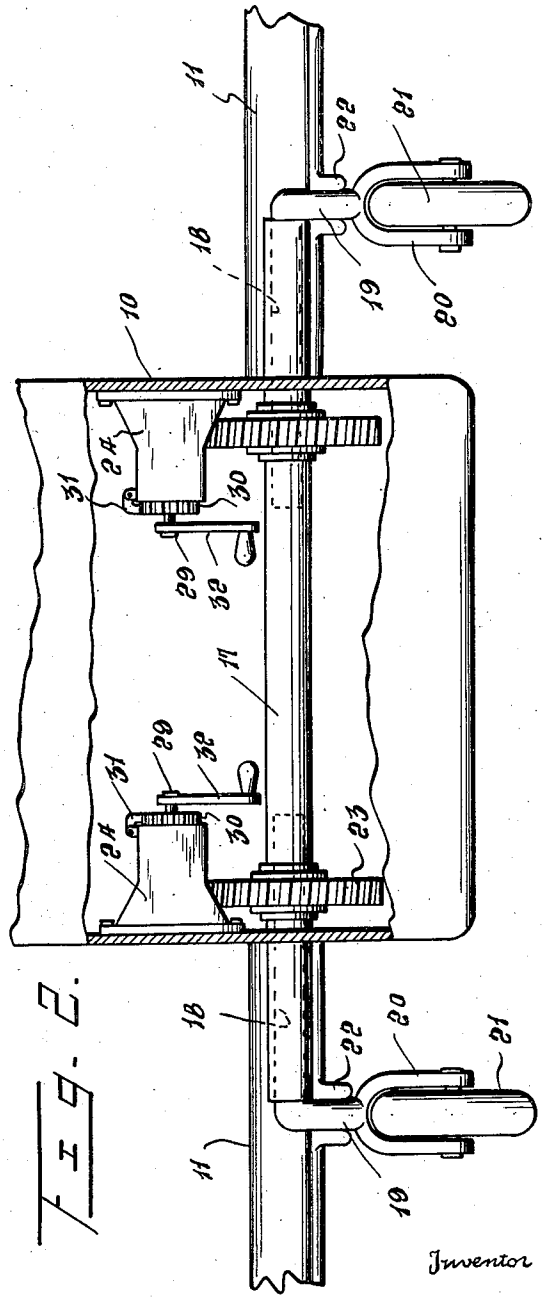


FIG. 2.

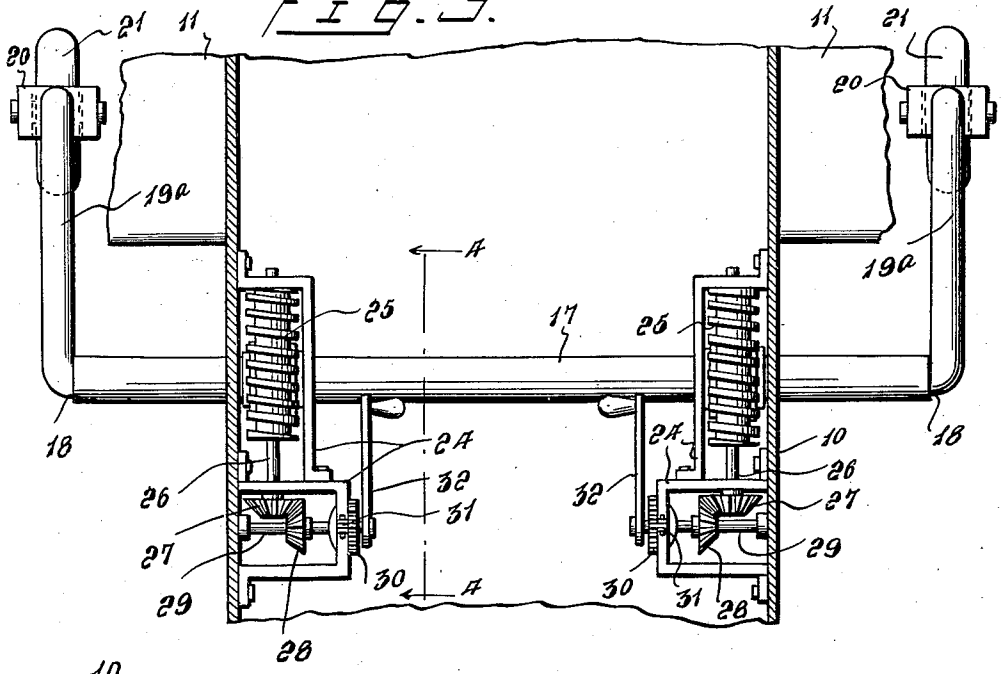
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Fig. 3.



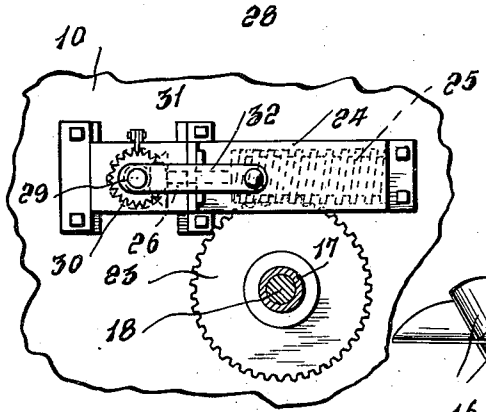
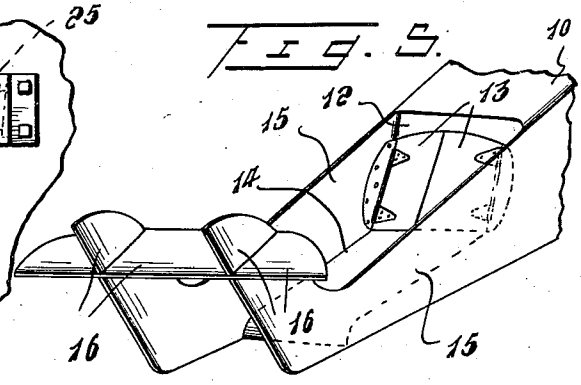


Fig. 4.

Fig. 5.



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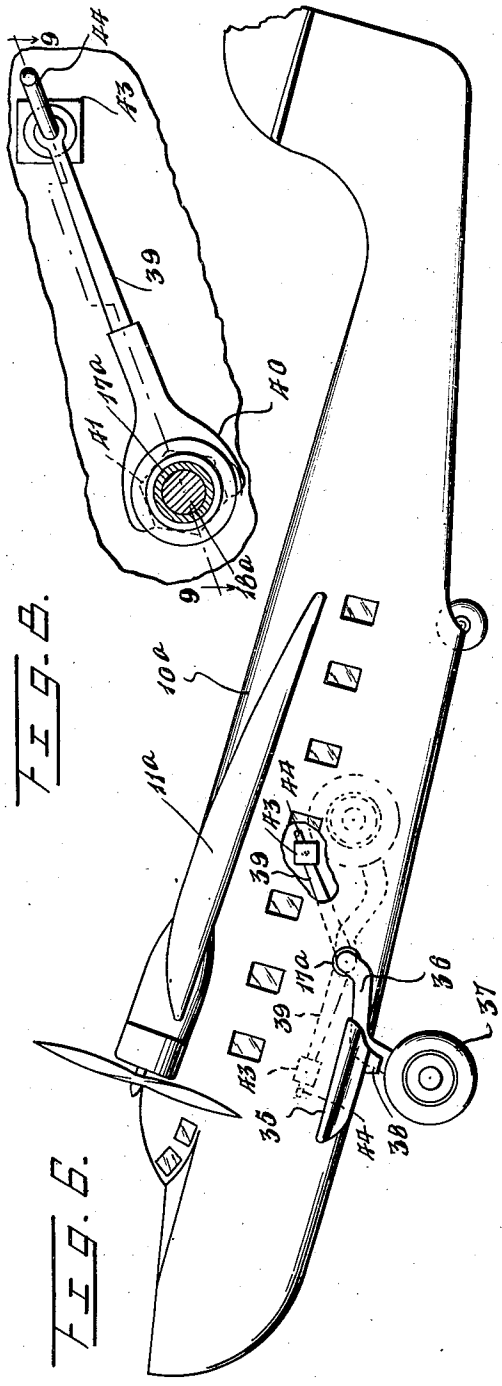


FIG. 6.

FIG. 8.

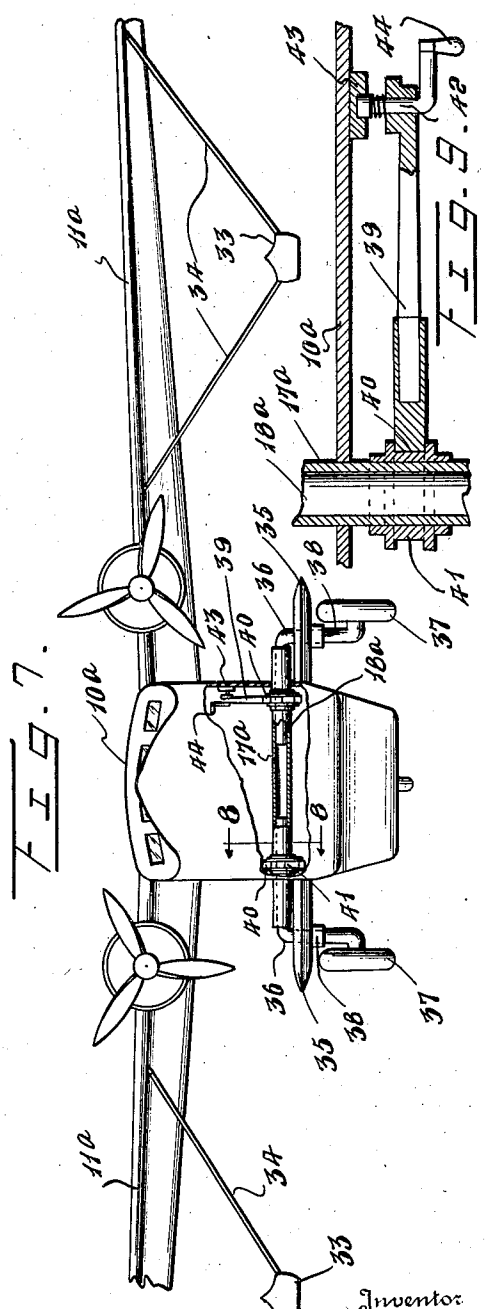


FIG. 7.

FIG. 9.

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AIRPLANE

Jakob Hojnowski, Nekoosa, Wis.

Application August 24, 1939, Serial No. 291,767

3 Claims. (Cl. 244—102)

This invention relates to certain new and useful improvements in airplanes.

An object of the invention is to provide an airplane with a retractible landing gear embodying a shaft construction extending transversely of the fuselage with ground wheels mounted upon opposite projecting ends of the shaft with manually operable means within the fuselage for rotating the shaft for the projection and retraction of the wheels of the landing gear relative to the fuselage.

A further object of the invention is to provide retractible landing gear for airplanes wherein the landing gear when in its extended position is abuttingly engaged with a side wing of the airplane, modifications of the landing gear mounting providing for either forward or rearward swinging movements of the landing gear into operative and retracted positions.

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings:

Figure 1 is a side elevational view, partly broken away and shown in section of an airplane constructed in accordance with the present invention, the landing gear being illustrated by full lines in its operative position and further shown by dotted lines in its retracted position, which is assumed by a forward, upward and rearward swinging movement;

Figure 2 is an enlarged fragmentary end elevational view, partly broken away, and shown in section, to illustrate manually operated gear devices for projecting and retracting the landing gear;

Figure 3 is an enlarged fragmentary horizontal sectional view, showing the worm gear train for operating the landing gear;

Figure 4 is a detail sectional view taken on line 4—4 of Figure 3;

Figure 5 is a fragmentary perspective view of the empennage or rear end of the fuselage showing a loading platform, side walls therefor and entrance doors to the rear end of the fuselage;

Figure 6 is a side elevational view of another form of airplane with a retractible landing gear abuttingly engaged with a side wing and retractible to an inoperative position by rearward and upward swinging movement;

Figure 7 is a fragmentary front elevational view, partly broken away and shown in section;

Figure 8 is an enlarged detail sectional view taken on line 8—8 of Figure 7, showing another form of operating device for the retractible landing gear; and

Figure 9 is a longitudinal sectional view taken on line 9—9 of Figure 8.

Referring more in detail to the accompanying drawings, and particularly to Figures 1 to 5, the reference character 10 designates the fuselage of an airplane with lateral wings 11. The fuselage 10 has a rear end wall 12 with an opening therein that is closed by hinged doors 13, the fuselage rearwardly of the rear wall carrying a loading platform 14 in the plane of the bottom wall of the fuselage and side walls 15, the rear ends of the side walls being provided with an elevator and rudder construction diagrammatically illustrated by the reference character 16.

The airplane is equipped with a retractible landing gear adjacent its forward end which includes a tubular shaft 17 journalled transversely of the fuselage as shown more clearly in Figures 2 and 3, the opposite ends of said tubular shaft 17 projecting laterally of the side walls of the fuselage 10 and having secured therein stub shafts 18 that carry right angularly directed extensions 19 forked as at 20 for the support of ground wheels 21. The extensions 19 as shown in Figure 1, carry leg portions 19a bent rearwardly to occupy positions in proximity of the wings 11 when the landing gear is in its extended operative position. As shown more clearly in Figures 1 and 2, the lower side of each wing 11 at the forward meeting edge thereof carries a forked guide into which the leg portion 19a of the extension 19 is received for limiting rearward swinging movement of the landing gear with the wing and forked guide acting as a bracing support for the landing gear. The landing gear is illustrated in its inoperative or retracted positions by dotted lines in Figure 1 and to assume such retracted position, the shaft 17 is rotated to swing the shaft extension 19, leg portions 19a and ground wheels 21, forwardly, upwardly and then rearwardly with the ground wheels 21 overlying the side wings 11.

The operating means for the shaft 17 for shifting the landing gear comprises dual means within the fuselage 10 adjacent each side wall thereof, each of said means comprising the fixing of a worm wheel 23 to the tubular shaft 17 adjacent a side wall of the fuselage. A bracket structure 24 is secured to the inner face of the side wall of the fuselage 10 above the shaft 17, one portion of the bracket structure rotatably sup-

porting a worm shaft 25 engageable with the worm wheel 23, one end of the shaft 26 carrying the worm shaft 25 having a bevel gear 27 fixed thereto that is in meshing engagement with a bevel gear 28 fixed to a shaft 29 journalled in the bracket structure 24 at right angles to the worm shaft 25 as shown in Figure 3. The shaft 29 supporting the bevel gear 28 has a ratchet wheel 30 fixed to one projecting end thereof and said ratchet wheel has a manually operated pawl 31 associated therewith, the shaft 29 being provided with a crank handle 32 outwardly of the ratchet wheel 30. When the pawls 31 are manually released from engagement with the ratchet wheels 30, two operators may work the crank handles 32 for the operation of the gear train to rotate the shaft 17 and thereby swing the landing gear from one position to another, the pawls 31 being then returned to position for engagement with the ratchet wheel for holding the landing gear in its shifted position. When the landing gear is projected into its operative position as shown by full lines in Figure 1, the leg portions 19*a* engage the forked bracket 22 carried by the wings 11 to be centered thereby and for bracingly supporting the landing gear. When the landing gear is retracted to its inoperative position as shown by dotted lines in Figure 1, the same swings forwardly and then upwardly and rearwardly with the ground wheels 21 positioned above the wings 11.

In the form of invention shown in Figures 6 to 9, the airplane is of the hydroplane type embodying a fuselage 10*a*, side wings 11*a*, positioned substantially in the plane of the upper surface of the fuselage 10*a* with pontoons 33 supported beneath the side wings 11*a* by means of supporting rods 34. Relatively smaller side wings 35 project laterally of the fuselage 10*a* substantially in the plane of the lower side of the fuselage and slightly forwardly of the main wings 11*a*.

The landing gear includes a tubular shaft 17*a* journalled transversely of the fuselage 10*a* with opposite ends of the shaft 17*a* projecting outwardly of the fuselage and having anchored therein the stub shafts 18*a* that carry forwardly directed arms 36 that carry ground wheels 37 at their free ends. As shown in Figure 6, the arms 36 are engaged with bifurcated lugs 38 carried by the rear lower edges of the wings 35 which limit forward swinging movement of the landing gear into its operative position. Operating means for the shaft 17*a* is arranged in duplicate and each operating means includes a lever 39 having a forked end 40 that has a keyed engagement with a key collar 41 secured to the tubular shaft 17*a*. The other end of the lever 39 carries a tensioned pin 42 extending transversely therethrough for reception into a socket in a keeper block 43, the tensioned pin 42 being retracted by means of the handle 44 carried thereby. A pair of socketed blocks 43 are arranged in spaced relation for holding the lever 39 in either of two positions as illustrated by dotted lines and full lines in Figure 6, with the landing gear either in its projected operative position or in its retracted inoperative position.

In both forms of the invention, the landing gear is retractable to inoperative position for positioning the ground wheels at points between the upper and lower surfaces of the fuselage and that when the landing gear is in its projected operative position, parts thereof are abuttingly engaged with wings of the airplane for the stabilization of the landing gears.

While there are herein shown and described the preferred embodiments of the invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

I claim:

1. In airplane construction of the character described, a fuselage having side wings and a retractible landing gear having parts thereof movable into abutting engagement with the undersides of the side wings in proximity of the fuselage when in extended operative position, the landing gear including a tubular shaft journaled transversely of the fuselage and projecting from opposite sides thereof, a stub shaft secured in each projected end of the tubular shaft, an angularly extending leg portion at the outer end of each stub shaft carrying a terminal fork for the support of a ground wheel, the engagement of the landing gear with the side wings being between the angularly extending leg portions and the undersides of the wings adjacent an edge thereof with the wings constituting bracing elements for the landing gear when in operative position.

2. In airplane construction of the character described, a fuselage having side wings and a retractible landing gear having parts thereof movable into abutting engagement with the undersides of the side wings in proximity of the fuselage when in extended operative position, the landing gear including a tubular shaft journaled transversely of the fuselage and projecting from opposite sides thereof, a stub shaft secured in each projected end of the tubular shaft, an angularly extending leg portion at the outer end of each stub shaft carrying a terminal fork for the support of a ground wheel, the engagement of the landing gear with the side wings being between the angularly extending leg portions and the undersides of the wings adjacent an edge thereof with the wings constituting bracing elements for the landing gear when in operative position, said shaft being located forwardly of the wings and the engagement of the landing gear with the wings being at the leading edges of the wings, and said leg portions being swingable rearwardly and upwardly into engagement therewith.

3. In airplane construction of the character described, a fuselage having side wings and a retractible landing gear having parts thereof movable into abutting engagement with the undersides of the side wings in proximity of the fuselage when in extended operative position, the landing gear including a tubular shaft journaled transversely of the fuselage and projecting from opposite sides thereof, a stub shaft secured in each projected end of the tubular shaft, an angularly extending leg portion at the outer end of each stub shaft carrying a terminal fork for the support of a ground wheel, the engagement of the landing gear with the side wings being between the angularly extending leg portions and the undersides of the wings adjacent an edge thereof with the wings constituting bracing elements for the landing gear when in operative position, said shaft being located rearwardly of the wings and the engagement of the landing gear with the wings being at the trailing edges of the wings, and said leg portions being swingable forwardly and upwardly into engagement therewith.

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