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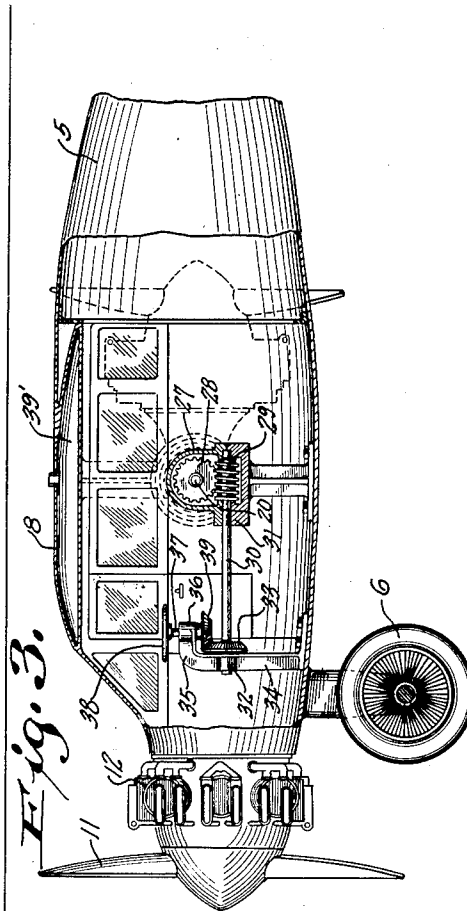
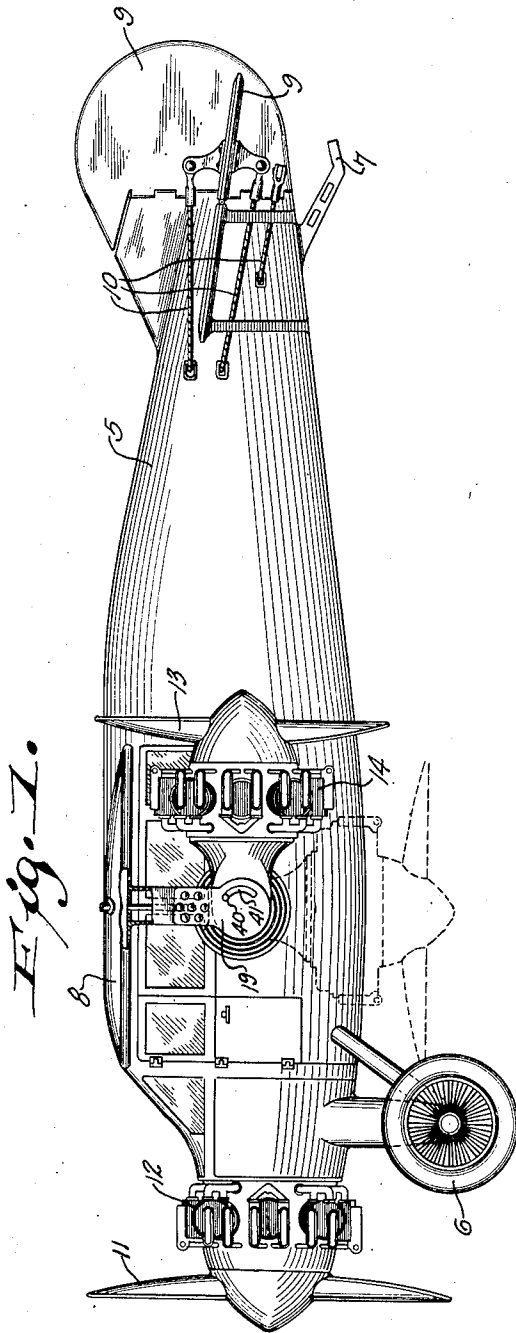
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1,752,012

AEROPLANE

Filed April 21, 1928

2 Sheets-Sheet 1



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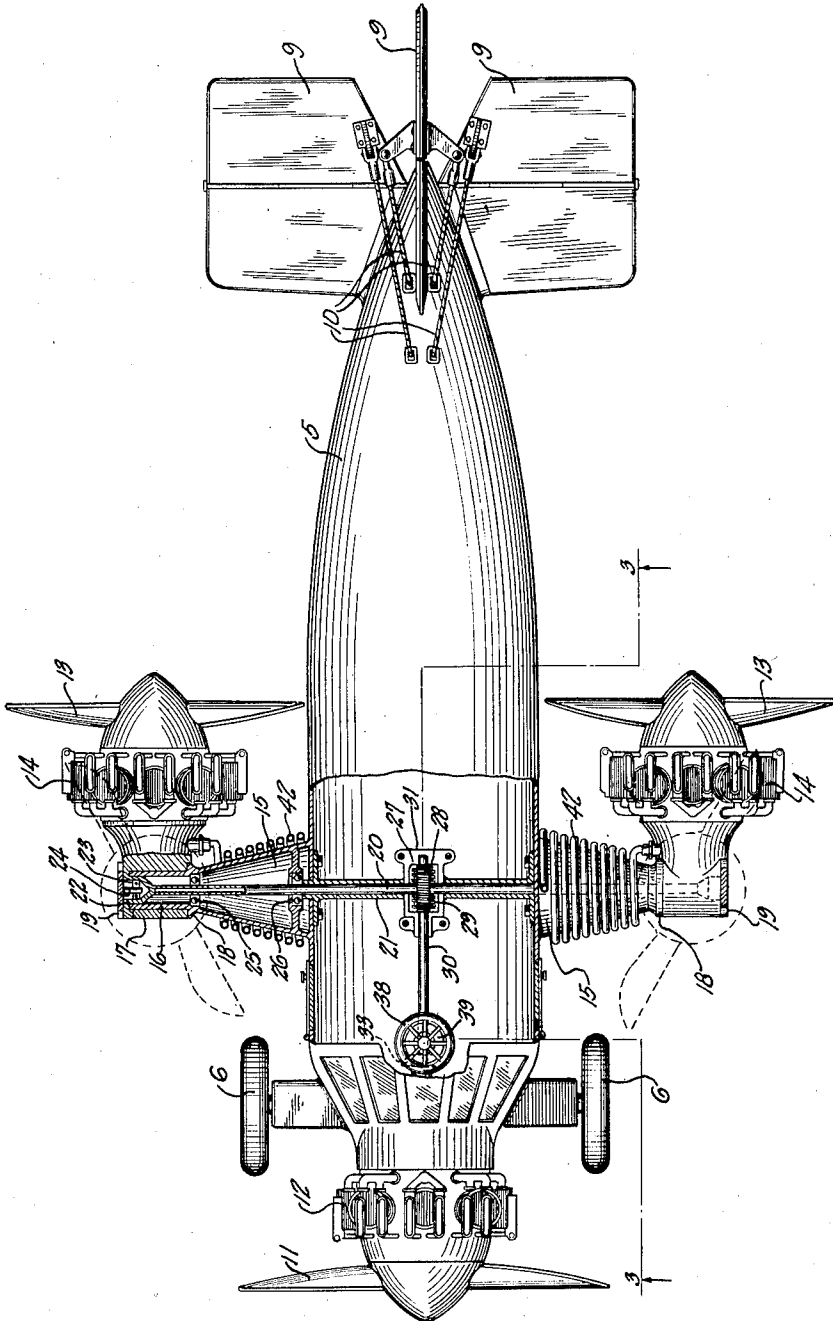
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*Fig. 2.*



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# UNITED STATES PATENT OFFICE

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AEROPLANE

Application filed April 21, 1928. Serial No. 271,945.

This invention relates to improvements in aeroplanes.

It is one of the objects of this invention to provide an aeroplane which will take off or land in substantially a vertical line, thereby obviating the necessity of having a large field for this purpose.

It is a further object of this invention to provide an aeroplane having side propellers which are readily adjustable from a horizontal position to a vertical position, or to any position therebetween to change the angle of travel.

It is a further object of this invention to provide an aeroplane which is equipped with a pair of side propellers and a front propeller, each propeller having a separate engine, and the side engines being adjustably movable with the side propellers.

It is a further object of this invention to provide a novel means for feeding gasoline from the tanks to the side engines to permit said engines to be adjustably moved without interfering with the gasoline feed line.

It is a further object of this invention to provide control means for the adjustable propellers which is readily operable from the pilot's seat, and which will lock the propellers at any desired angle so that air resistance or other outside forces cannot change the angle of adjustment.

It is a further object of this invention to provide an aeroplane which is simple in construction and operation and well adapted for the purpose described.

With the above and other objects in view, the invention consists of the improved aeroplane and all its parts and combinations as set forth in the claims and all equivalents thereof.

In the accompanying drawings, in which the same reference characters designate the same parts in all of the views:

Fig. 1 is a side elevation of the improved aeroplane, part being broken away; the dotted lines indicating the horizontal position of the side propellers;

Fig. 2 is a plan view of the aeroplane, part being broken away, and part being shown in section; and

Fig. 3 is a fragmentary side elevation, parts being broken away and parts being shown in section to illustrate the control for the adjustable propellers.

Referring to the drawing, the numeral 5 designates the body portion which is supported, when on the ground, by wheels 6 and by a tail drag 7. The body portion is provided with wings 8 and with rudders 9 operable in the ordinary manner by ropes 10 which extend to the control rods.

The aeroplane is propelled by a front propeller 11 which is driven by a motor 12, and by a pair of side propellers 13 driven by motors 14.

Projecting from each side of the body is a cone-shaped extension 15 having a cylindrical outer end portion 16. As the construction on each side of the body is identical, only one unit will be described. The cylindrical portion 16 is journaled in a bearing 17 extending from the motor 14. The inner end of the latter bearing engages an annular shoulder 18 on the extension 15 which prevents inward movement. An arm 19 extending from the wing engages the outer end of the bearing 17 to prevent outward movement. The engine 14 and the propeller 13 are thus free to pivot on the portion 16 of the extension 15 and the propeller 13 is rotatable independently of the engine.

A rotatable shaft 20, journaled in a bearing 21, has its end portions secured to the bearings 17. The ends of the shaft are cup-shaped as at 22 to receive a ball bearing member 23 which is positioned around a pin 24 extending inwardly from the lower portion of the arm 19. Ball bearing units 25 and 26, within the extension 15, surround intermediate portions of the shaft 20. On a medial portion of the shaft and within a housing 27, a worm wheel 28 is rigidly mounted. The worm wheel meshes with a worm 29 on one end of a shaft 30 which latter is positioned at right angles to the shaft 20 and is journaled in bearings 31 and 32.

The other end of the shaft 30 carries a rigidly mounted bevel gear 33. The bearing 32 is in a bracket 34, the latter having an upper right angular extension 35 having another

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bearing portion 36. Within this latter bearing a short shaft 37 is journaled, the said shaft having a hand wheel 38 on its upper end and a bevel gear 39 on its lower end, the latter meshing with the bevel gear 33. By turning the hand wheel 38, the shaft 30 is rotated, and through the worm and worm wheel, the shaft 20 is also turned to pivotally adjust the angle of the propellers 13.

A pin 40 extends from the outer side of each bearing portion 17 (see Fig. 1) and is adapted to ride in a curved slot 41 in the arm 19. This construction limits the pivotal movement of the engine and propeller to one quarter turn.

Gasoline tanks 39' are positioned within the wings 8. The tanks are preferably three in number, one for each engine. For each of the side engines a feed line 42 of flexible tubing is provided. These feed lines extend from their respective tanks to the engines, the intermediate portion being coiled about the cone-shaped extensions 15. When the propellers and engines are pivotally adjusted, the coil arrangement will prevent interference with the feed line, the coils being wound or unwound as the engines and propellers are pivoted.

The operation of the device is as follows: When it is desired to take off, the side propellers are adjusted to the horizontal position as shown by the dotted lines in Fig. 1. The side engines only are then started, and the plane will ascend in a substantially vertical line. When it has reached a proper altitude, the propellers are gradually adjusted to the vertical position for straight flying, and at the proper time the front engine is started. The plane may thus be propelled by three propellers, or, if desired, by one or two propellers only. To accomplish a rapid change of altitude at any time, the side propellers are adjusted to the horizontal position, or for a less rapid ascent to any position between the horizontal and vertical. The procedure for making a landing is the reverse of that for taking off, the side propellers being adjusted to the horizontal position and the front engine being shut off. The plane is then permitted to settle gradually upon the ground, and this may be accomplished in a practically vertical line.

It is not desired to limit the scope of this invention to an aircraft of the particular type shown, as the broad concept of the invention contemplates its use in connection with various types of aircraft. For example, the adjustable propeller could be used to advantage on a dirigible to facilitate taking off and landing in a small space.

From the foregoing description it may be seen that the improved aeroplane is simple in construction and operation and well adapted for the purpose described.

What I claim is:

1. An aircraft having a body portion, an engine pivotally connected to said body portion, a propeller driven by said engine, said engine and propeller being adjustable to various angles with respect to said body portion to change the angle of travel of said body portion, a gasoline tank in connection with said body portion, and a gasoline feed line extending between the tank and the engine, said feed line being coiled to permit it to be wound and unwound as the engine and propeller are pivotally adjusted.

2. An aircraft having a body portion with an extension therefrom having an interior opening, an engine pivoted on said extension, a propeller driven by said engine, a rotatably mounted shaft extending through the opening in said body extension, one end of said shaft being secured to a portion of the engine, a worm wheel rigidly mounted on said shaft, a second rotatably mounted shaft at right angles to the first shaft, a worm rigidly mounted on said second shaft and engaging the worm wheel, and means for turning said second shaft to pivotally adjust said engine and propeller to various angles with respect to said body portion to change the angle of travel of said body portion.

3. An aircraft having a body portion with an extension therefrom having an interior opening, an engine pivoted on said extension, a propeller driven by said engine, a rotatably mounted shaft extending through the opening in said body extension, one end of said shaft being secured to a portion of the engine, a worm wheel rigidly mounted on said shaft, a second rotatably mounted shaft at right angles to the first shaft, a worm rigidly mounted on said second shaft and engaging the worm wheel, means for turning said second shaft to pivotally adjust said engine and propeller to various angles with respect to the body portion to change the angle of travel of said body portion, a gasoline tank in connection with said body portion, and a feed line extending from said gasoline tank to said engine, the intermediate portion of said feed line being coiled about the body extension to permit said feed line to be wound and unwound as the engine and propeller are pivotally adjusted.

4. An aircraft having a body portion, a rotatable front propeller, an extension on each side of said body portion, said extensions having interior openings therein, an engine pivoted on each extension, a propeller driven by each engine, a rotatably mounted shaft extending through the openings in the body extensions, each end of the shaft being connected to a portion of one of the side engines, a worm wheel on an intermediate portion of the shaft, a second rotatably mounted shaft at right angles to said first shaft, a worm on said second shaft engaging the worm

wheel, means for turning said second shaft to simultaneously adjust the side engines and propellers to various angles with respect to the body portion to change the angle of travel of said body portion, a gasoline tank in connection with said body portion, and a feed line for each engine extending from the gasoline tank to the engine, each feed line having an intermediate portion coiled about the adjacent body extension to permit said feed line to be wound or unwound as the engine and propeller are pivotally adjusted.

5. An aircraft having a body portion, a fixed source of liquid fuel supply in connection with said body, an engine mounted on said body and adjustable to various angles with respect thereto, a propeller driven by said engine, and coiled means for feeding liquid fuel from said fixed source of fuel supply to said engine in any adjusted position of said engine.

6. An aircraft having a body portion provided with an extension, an engine pivotally connected to said extension, a propeller driven by said engine, said engine and propeller being adjustable to various angles with respect to said body portion to change the angle of travel of said body portion, a gasoline tank in connection with said body portion, and a gasoline feed line extending between the tank and the engine and coiled around said body extension to permit the feed line to be wound and unwound as the engine and propeller are pivotally adjusted.

In testimony whereof, I affix my signature.

GEORGE Y. LAUCHIN.

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