F. W. LAKE.

AEROPLANE.

APPLICATION FILED DEC. 1, 1917.

1,278,358.

Patented Sept. 10, 1918.

3 SHEETS—SHEET 1.

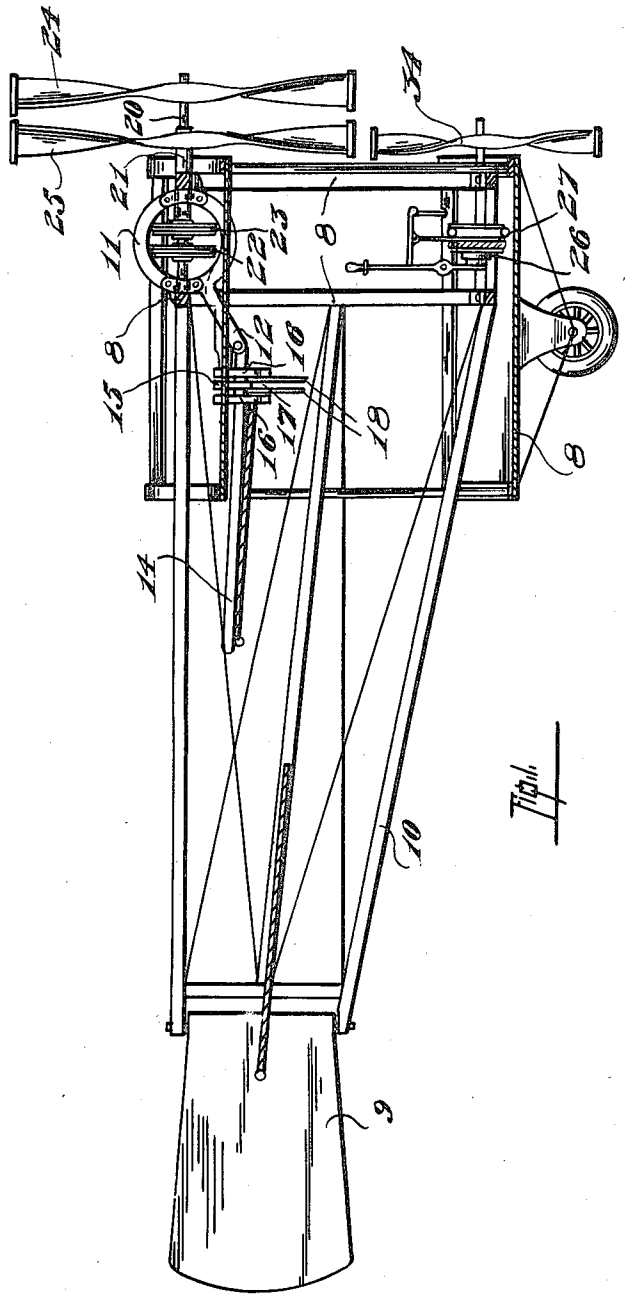


Fig. 1.

BY

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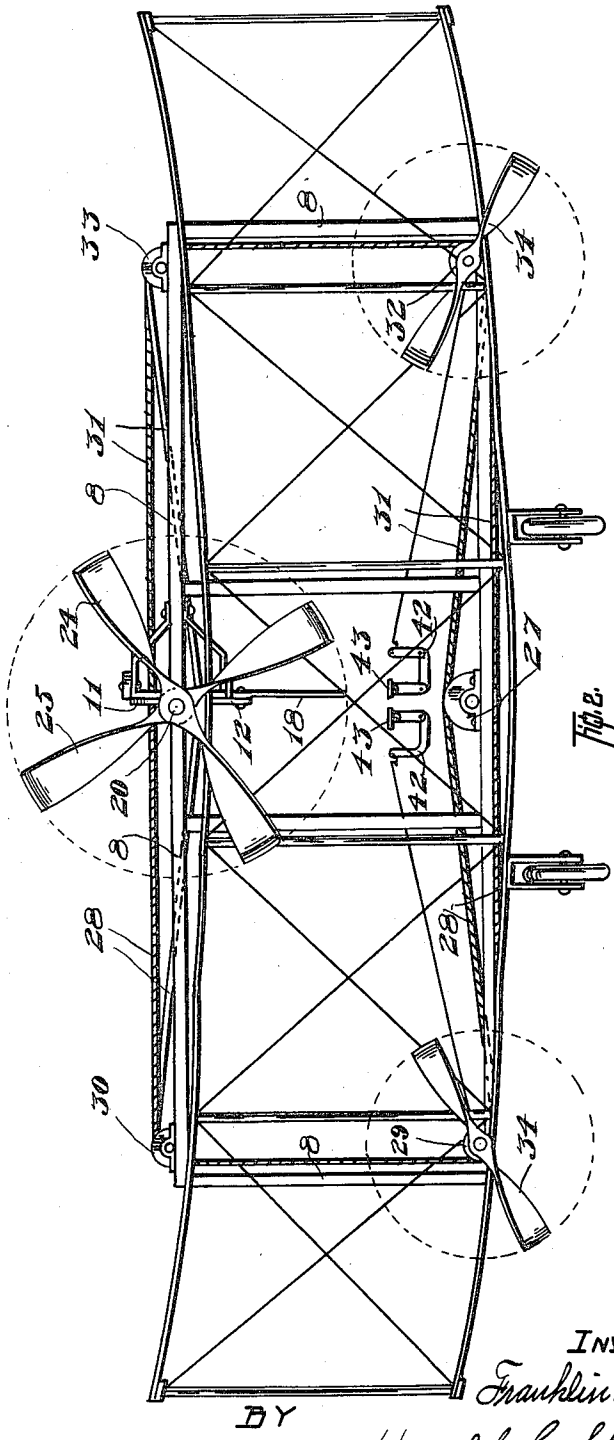


Fig. 2.

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3 SHEETS—SHEET 3.

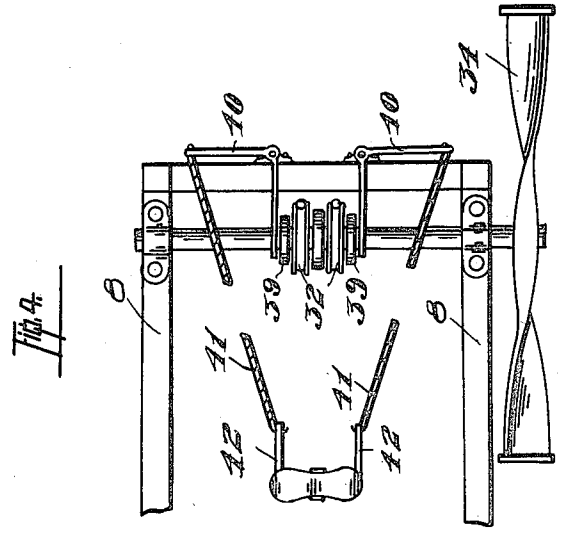


Fig. 4.

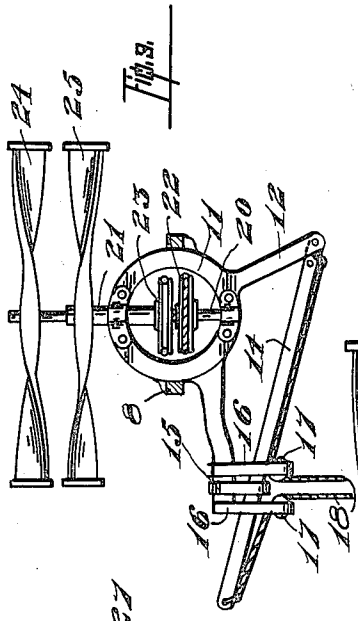


Fig. 3.

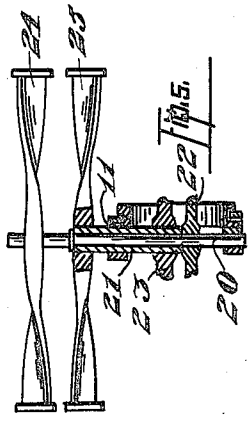


Fig. 5.

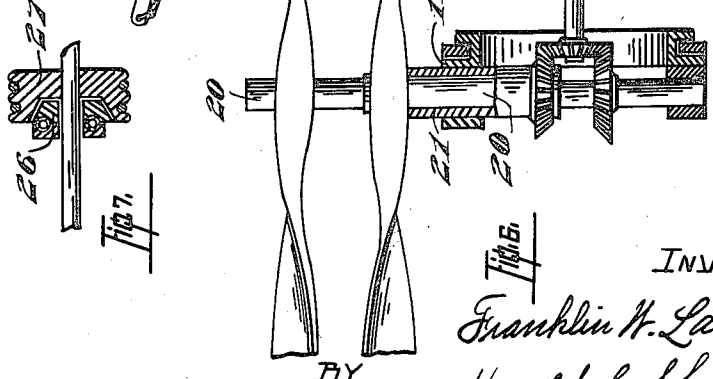


Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

FRANKLIN WILLIAM LAKE, OF KINGSTON, ONTARIO, CANADA.

AEROPLANE.

1,278,358. Specification of Letters Patent. Patented Sept. 10, 1918.

Application filed December 1, 1917. Serial No. 204,825.

To all whom it may concern:

Be it known that I, FRANKLIN WILLIAM LAKE, a citizen of the Dominion of Canada, residing at Kingston, in the county of Frontenac and Province of Ontario, Canada, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

This invention relates to improvements in aeroplanes and has for its particular object a novel means of operating the propellers.

The object of my invention is to provide a simple and easily operated construction whereby the aeroplane propeller may be tilted from a horizontal to a vertical, from a vertical to a horizontal or any intermediate angular position.

A further object is in the principle used in operating the propellers.

A further object is in having double propellers on the same reciprocating shaft and operating in opposite directions.

A further object is in the using of my novel means of operating the main propellers, to operate subsidiary propellers which assist in turning.

A further object is in the novel construction of the ends of the propellers.

With these and other objects in view, the invention consists in the construction, combination and arrangement of parts as will be hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

Figure 1 is a side elevation showing an aeroplane constructed on the principle of my invention. Fig. 2 is a front view of the same. Fig. 3 is a detail view of the propeller reciprocating means. Fig. 4 is a detail view of one of the subsidiary propellers and engagement means for the same. Fig. 5 is a sectional view of the propeller operating shaft. Fig. 6 is a modified form of the operating shaft. Fig. 7 is a sectional view of the clutch.

Referring to the drawings like numerals designate like parts in the various drawings.

8 is a main frame which may be of any particular style of construction and may have any suitable guiding tail or vane 9 which can be supported at the rear end of the main frame 8 by any suitable framework 10.

Mounted in any suitable way to frame 8 is a reciprocating annular ring 11 having an arm 12 extending out from the same. The outer end of this arm 12 is pivotally attached to one end of a slide lever 14 which is adapted to slide in any suitable guide 15. Attached at each side of said guide are arms 16 having pulleys 17 at one end over which ropes or other suitable guide means 18 are passed. The ropes 18 are respectively attached one at each end of the slide lever 14. The other ends of ropes 18 may extend over suitable pulleys and to suitable levers in the operator's box whereby they may be operated as desired. In Fig. 1 the propellers are shown in a horizontal position. In Fig. 3 they are shown in a vertical position.

Suitably journaled on the annular ring 11 are shaft 20 and sleeve 21, the latter fitting partially over the former. 22 is a pulley securely mounted to a shaft 20, while 23 is a pulley securely mounted to sleeve 21. 24 is a propeller securely mounted at the outer end of shaft 20, and 25 is an oppositely curved propeller securely mounted near the outer end of sleeve 21.

26 is a suitable clutch adapted to operate on a double pulley 27. 28 is a cable or chain which extends around one section of the pulley 27 over pulleys 29 and 30 and around the pulley 22. 31 is a similar driving means which extends around the other section of pulley 27 and over pulleys 32 and 33 and around the pulley 23. These driving means 28 and 31 will operate the pulleys 22 and 23 in opposite directions therefore turning the propellers 24 and 25 in opposite directions, and thus add considerable extra strength over the single propeller.

Subsidiary propellers 34 are suitably journaled near the outer front corners of frame 8 and are on the same shaft or suitably geared to the same shaft as pulleys 29 and 32. These propellers are only operated when desirous of assisting in turning. If the pulleys 29 or 32, which are in pairs, are mounted on the same shaft as the propeller 34, the pulleys will act as idlers. 39 are suitable slidable clutches on the shaft. 40 is a pair of angle-irons suitably mounted on frame 8 and adapted to have one end operate to press one of the clutches 39 against one of the pulleys 32. Suitable connecting means 41 attach the other end of the angle-iron 40 to suitable angle-irons 42 which may be located in the operator's box. 43 is a foot pad having one end attached to one end of

one of the angle-irons and the other end attached to the other angle-iron, so as to operate the propeller 34 in a forward or reverse movement. This will be clearly understood upon reference to Fig. 4. It will be noted that the footpads 43 are pivoted midway of their length so that working them forward or back will engage either pulley 32, at the will of the operator.

If desired, shafting may be used instead of the rope or cable and in this case I show in Fig. 6 a simple arrangement of parts to operate the main propellers. This construction of a tiltable double propeller may be introduced not only into new machines being built, but also into machines which are now in operation. In the latter case the change in construction is very little different and would require very small expense. By having the double propeller tiltably mounted the aeroplane is much more under the control of the operator. When the propellers are in a vertical position the aeroplane will rise perpendicular. In lighting the vertical position of the propellers will greatly assist in landing at a desirable place.

The propellers which I show in my construction are provided with a flat strip attached around the end which will hold the air to considerable extent instead of allowing it to fly freely off the ends of the propellers. This will add considerable strength and stability to the machine.

From the foregoing it is thought that the construction of my invention will be clearly understood, and therefore a more extended explanation has been omitted.

What I claim as new, is,—

1. In an aeroplane, a frame, a tiltably mounted member therein having an outwardly extending arm, a lever connected at one end to the outer end of said arm, ropes attached to said lever, means connected with said ropes for actuation thereof, a shaft and a sleeve in said tiltable member, and propellers mounted on the outer ends of said shaft and sleeve whereby the propellers are tiltably mounted.

2. In an aeroplane, a frame, a tiltably mounted member therein having an outwardly extending arm, a lever connected at one end to the outer end of said arm, ropes attached to said lever, means connected with said ropes for actuation thereof, a shaft and a sleeve in said tiltable member, propellers mounted on the outer ends of said shaft and sleeve whereby the propellers are tiltably mounted, and driving means to turn said propellers in opposite directions.

3. In an aeroplane, a frame, a tiltably mounted ring therein having an outwardly extended arm, a slide lever pivotally attached at one end to the outer end of said arm, a guide for said lever, ropes attached to said lever, means connected with said ropes for actuation thereof, a shaft and a sleeve in said ring, the latter fitting partially over the former, pulleys on said shaft and sleeve, propellers mounted on the outer ends of said shaft and sleeve whereby the double propellers are tiltably mounted.

4. In an aeroplane, a frame, a tiltably mounted ring therein having an outwardly extended arm, a slide lever pivotally attached at one end to the outer end of said arm, a guide for said lever, ropes attached to said lever, means connected with said ropes for actuation thereof, a shaft and a sleeve in said ring, the latter fitting partially over the former, pulleys on said shaft and sleeve, propellers mounted on the outer ends of said shaft and sleeve whereby the double propellers are tiltably mounted, and driving means adapted to turn said pulleys in opposite directions.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANKLIN WILLIAM LAKE.

Witnesses:
F. S. S. JOHNSON,
INA L. MILLER.