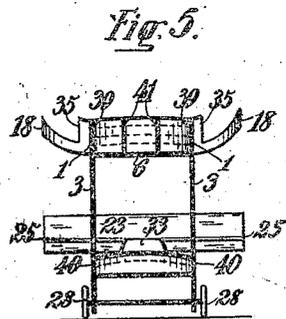
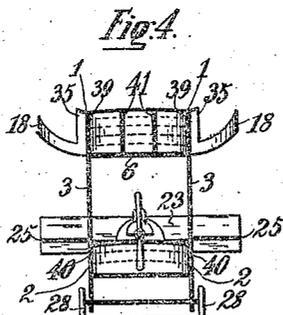
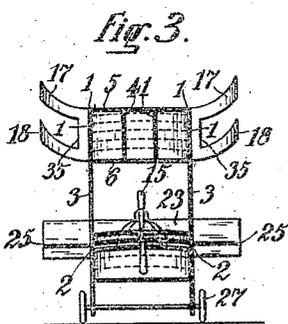
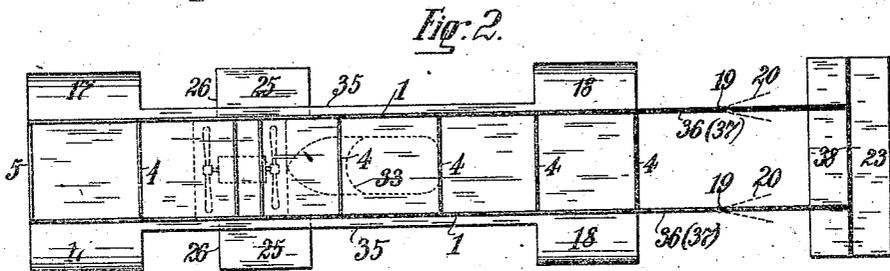
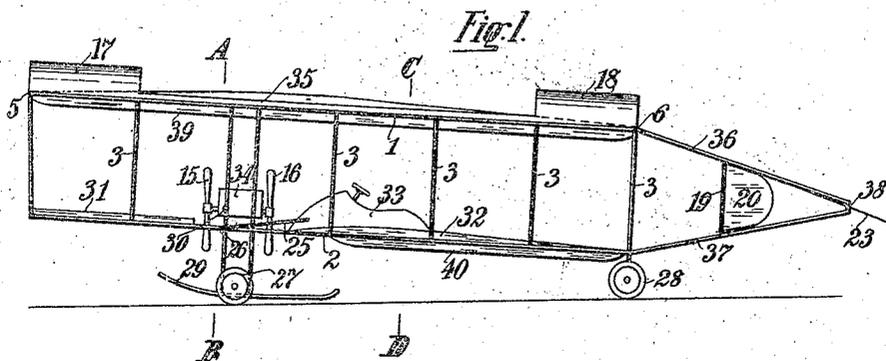


B. FLICK & P. REINIG.
 FLYING DEVICE.
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Patented Oct. 28, 1913.



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BERTHOLD FLICK AND PAUL REINIG, OF BERLIN-MARIENDORF, GERMANY.

FLYING DEVICE.

1,076,879.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, BERTHOLD FLICK and PAUL REINIG, subjects of the Grand Duke of Baden, residing at Berlin-Mariendorf, Germany, have invented certain new and useful Improvements in Flying Devices; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a flying apparatus based on the principle of oblique surfaces in combination with a suitable propelling device, in which the bearing surfaces have a new arrangement insuring a smaller air resistance, increased stability and possibility of almost unlimited increase of size for the purpose of heavy transport.

A construction according to this invention is illustrated in the accompanying drawing in which—

Figure 1 is a side elevation of the apparatus, Fig. 2 a plan, Fig. 3 a front elevation, Fig. 4 a vertical cross-section through the flying apparatus on line A—B of Fig. 1, and Fig. 5 a cross-section on line C—D of Fig. 1.

Unlike in the well known gliding flying apparatus, the bearing surfaces in the construction according to this invention have considerably greater length than width, the direction of length being understood to be that of the flight. These surfaces have in places slight lateral extensions used for steadying the whole system, that is to say, for preventing oscillations or even tilting over.

The bearing surfaces are double and arranged one above another, that is to say, the apparatus is a so-called biplane. It consists of two superposed frames, an upper frame 1 and a bottom frame 2 connected together by vertical struts 3 and provided with transverse ribs 4 which, by their curvature, give the bearing surfaces the desired shape. The frames are covered with suitable material and this covering, that is to say, surfaces are indicated in the drawing by hatching.

The upper bearing surface forms an inverted flat trough, the deepest point of which is situated at about one-third of the length of the front portion. The front and back cross-frame parts 5 and 6 are straight. The bottom bearing surface is formed of two parts, a front part 31 and a rear part 32 separated from each other by a free space. While the front part 31 of the bottom bearing surface is arched only in the transverse direction, the rear part 32 is curved in the same way as the upper bearing surface, that is to say, forms a trough upward.

On the front part of the bottom bearing surface 32 is mounted the pilot seat 33 which, for the purpose of reducing the air resistance, can be closed outward by rounded off walls.

In the intermediate space between the front and rear parts of the bottom bearing surface, is arranged the engine 34 with the two propellers 15 and 16, one of which is in front, and the other at the back of the engine, and of which each can rotate in opposite direction to the other. This arrangement obviates any turning momentum which would be liable to produce a tilting of the whole system.

The upper surface or air-plane has lateral wings or extensions 17 and 18 at its extreme front and rear portions respectively. These wings are curved upwardly, and they project from the side edges of the frame 1. Narrow upwardly curved extensions 35 also project laterally from the side edges of the frame 1, and extend longitudinally between the curved wings 17 and 18. These wings 17 and 18 and the extensions 35 operate to steady the machine by contact with the air which escapes laterally from under the upper air-plane. The lower frame 2 is also provided with wings 25 for steadying the machine. These wings 25 are arranged outside the frame 2 at the sides of the motor 35, and in front of the pilot seat 33. The front ends of the wings 25 are pivoted at 26 to the frame 2, and the wings 25 can be arranged in line with the frame 2 and the lower air-plane, or they can be set at any desired acute angle to the frame, and they are shown in—

clined with their rear ends above the frame 2. The wings 25 may be adjusted and secured by hand in any approved manner. The frames 1 and 2 have auxiliary frames 36 and 37 at their rear ends which are inclined toward each other at an acute angle and which have their rear ends secured together. A rudder 23 is mounted on a horizontal pivot 38 at the rear ends of the frames 36 and 37. Rudders 20 are mounted on vertical spindles 19 at the middle parts of the frames 36 and 37, and are arranged one on each side of the machine. The means for operating these rudders and the rudder 23 are not shown as they are of any approved kind.

The upper bearing surface can be preferably made a little longer than the bottom one, so that in the horizontal position of the frames, the front end of the upper frame slightly projects beyond the front end of the bottom frame.

The whole apparatus is provided, for resting on the ground and starting, with wheels 27 and 28, and the axle supports are calculated in such manner that for the purpose of starting, the front end occupies a higher position than the rear end, so that during the forward movement on the ground, the air current strikes the bearing surfaces from below.

For further steadying, and also for guiding the air under the gliding surfaces, both the bottom and the upper gliding surfaces are provided with downward flanges 39 and 40. The gliding surfaces can also be provided at their bottom surface with other downward ribs or longitudinal projections 41 as shown by way of example in the case of the upper bearing surface in Figs. 3-5.

For the purpose of landing, the apparatus is provided with gliding runners 29 which can be arranged at any point, for instance close to the front wheels or under the engine, so that when the wheels mounted in a very elastic manner, are forced back in landing, the weight of the vehicle rests on the runners and is utilized for braking.

In order to insure an increased speed of flight after the desired height has been reached, the propeller spindle is arranged so that it can be turned, in such manner that the whole engine with the propellers can be turned about a horizontal axis for instance at 30. This is effected from the pilot seat 23 by means of a suitable device. The motor or engine 34 has its casing pivoted at 30 to one of the uprights 3, and its level may be adjusted in any approved way, and when adjusted it may be secured by any suitable fastening. The propeller shaft can be thereby placed completely or practically in the longitudinal direction of flight, while normally it forms a certain angle with the said longitudinal direction. In that way, the propelling effort acts completely in the

direction of the bearing surfaces. The latter do not therefore form any obstacle for the advance, and the speed can be very considerably increased in that manner.

This arrangement, in addition to the already mentioned increase of stability, increase of speed and possibility of safe landing, has the advantage of enabling the apparatus to be made of very considerable size without any difficulties. While in gliding flying apparatus with bearing surfaces extended in the transverse direction there is very soon reached a limit of size owing to the impossibility of increasing the strength of the whole system to the desired extent, the strength in the construction according to this invention can never form an obstacle to the increase of size of the apparatus, as the propelling power acts in the longitudinal, that is to say, in the most favorable, direction. Another advantage is finally the ease of transporting the whole on the ground, and moreover owing to the small width, the possibility of starting from the roads.

What we claim is:

1. In a flying machine, the combination, with a frame, and upper and lower air-planes having their side edges secured to the frame, said air-planes being of relatively great length in proportion to their width; of upwardly-curved wings projecting laterally from the extreme front and rear portions of the upper air-plane, and relatively short upwardly-curved wings or extensions projecting from the upper air plane and extending longitudinally between the adjacent end portions of the aforesaid wings close to the frame, all the said wings being arranged outside the frame.

2. In a flying machine, the combination, with a frame, and upper and lower air-planes having their side edges secured to the frame and being formed of relatively great length in proportion to their width, the upper air-plane being trough-shaped and curved both longitudinally and laterally, and the lower air-plane being formed of trough-shaped front and rear sections having a space between them, the front section being curved laterally, and the rear section being curved laterally and longitudinally; of a motor provided with a propeller and secured to the frame over and in the space between the said sections, and a seat for the pilot arranged at the front end portion of the lower section.

3. In a flying machine, the combination, with a frame, and upper and lower air-planes having their side edges secured to the frame and being formed of relatively great length in proportion to their width, the lower air-plane being formed of front and rear sections having a space between them; of a motor provided with front and

rear propellers and having its casing piv-
oted to the said frame by horizontal pivots
projecting from its sides between the pro-
pellers, the said motor with its propellers
5 being arranged in the space between the sec-
tions of the lower air-plane and being ad-
justable on the pivots.

In testimony whereof we affix our signa-
tures, in presence of two witnesses.

BERTHOLD FLICK.
PAUL REINIG.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.