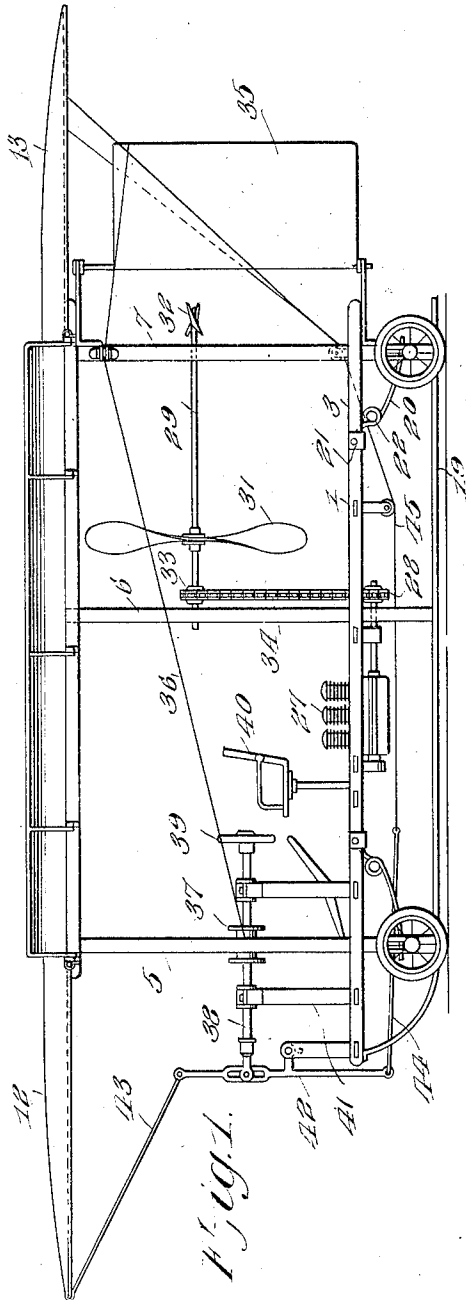


G. F. EKLUND.
FLYING MACHINE.
APPLICATION FILED DEC. 16, 1911.

1,047,010.

Patented Dec. 10, 1912.

3 SHEETS—SHEET 1.



Witnesses
Frank Hough

G. F. Eklund

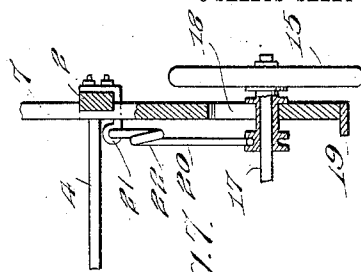
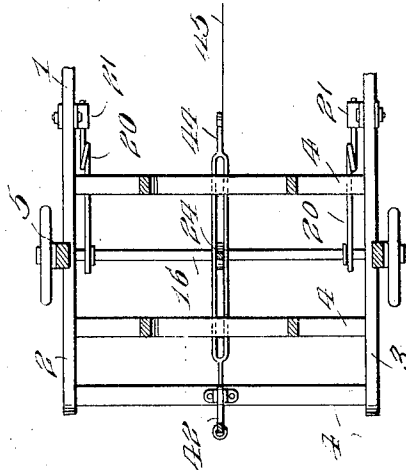


Fig. 5.



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3 SHEETS—SHEET 2.

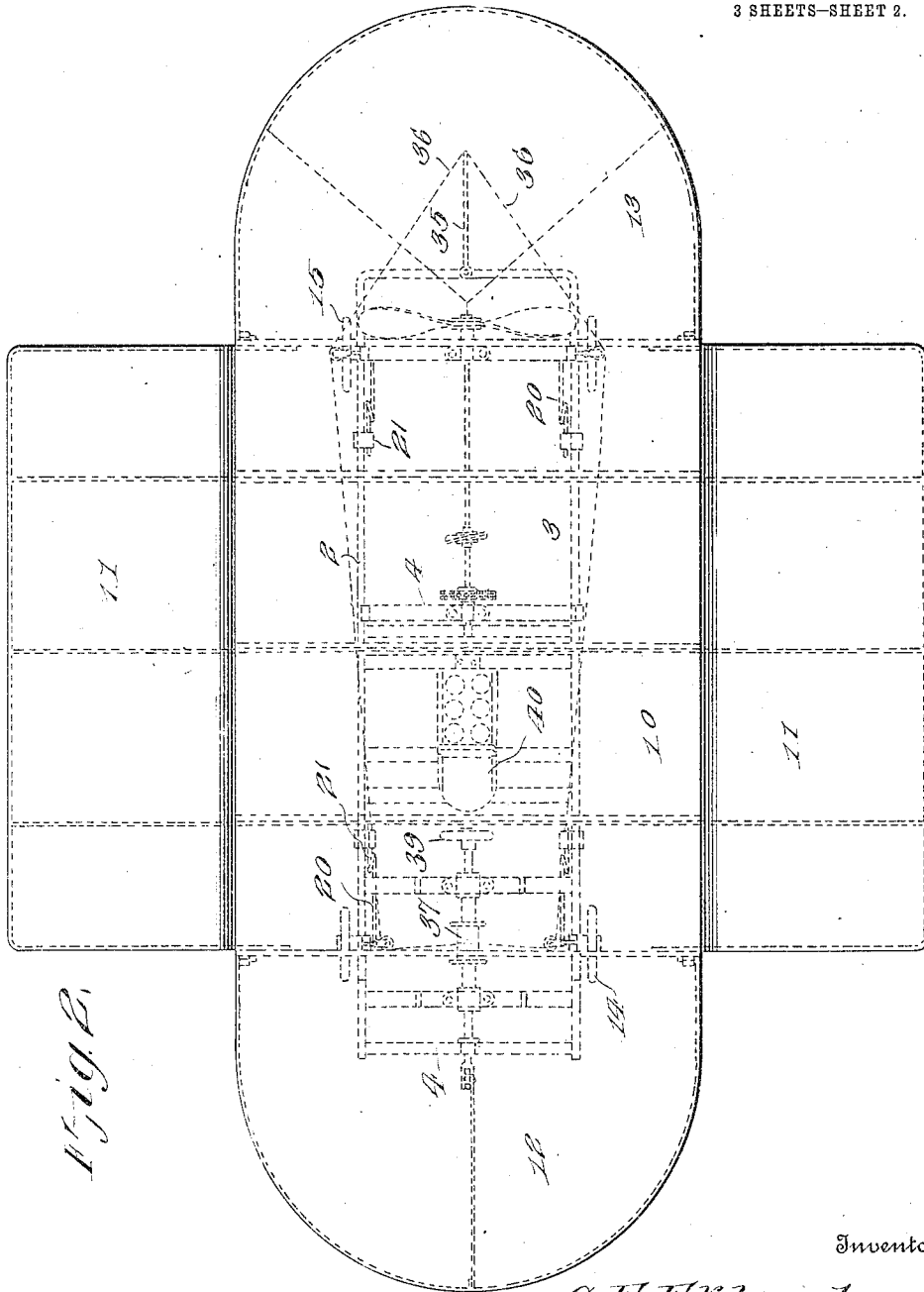


Fig. 2.

Witnesses

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C. E. Hines.

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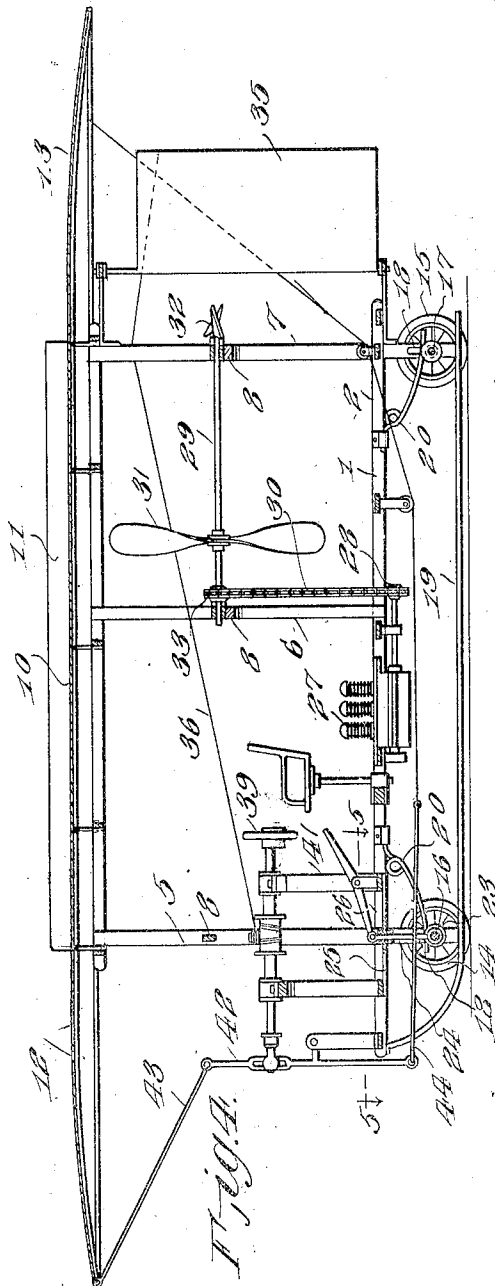
By Victor J. Evans

Attorney

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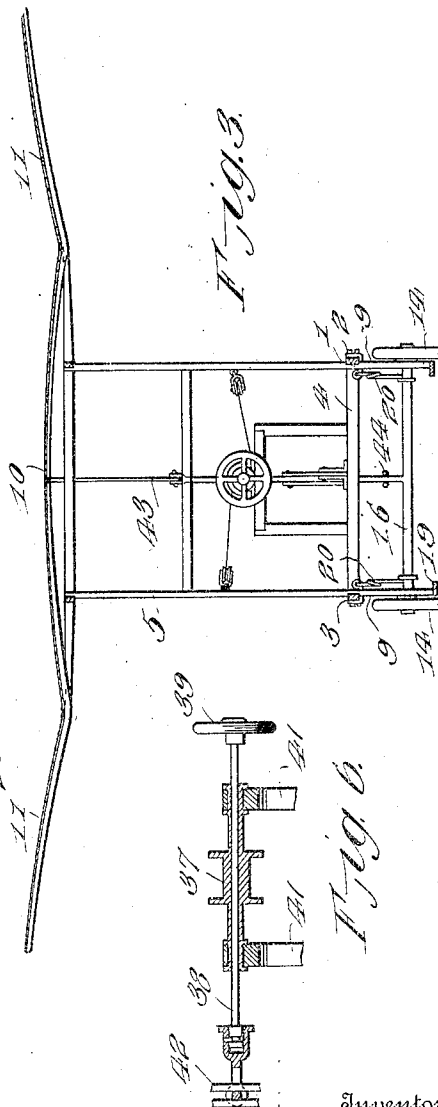
Patented Dec. 10, 1912.

3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

GUSTAVE F. EKLUND, OF DRACUT, MASSACHUSETTS.

FLYING-MACHINE.

1,047,010.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed December 16, 1911. Serial No. 666,106.

To all whom it may concern:

Be it known that I, GUSTAVE F. EKLUND, a citizen of the United States, residing at Dracut, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to flying machines, and its object is to provide a flying machine of the heavier-than-air class which is simple of construction and possesses maximum general efficiency.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a flying machine embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical transverse section through the machine. Fig. 4 is a vertical longitudinal section thereof. Fig. 5 is a sectional plan view on the line 5—5 of Fig. 4. Fig. 6 is a detail horizontal section through the controlling mechanism. Fig. 7 is a vertical transverse section through the frame on a line through the axis of one of the sets of supporting wheels.

Referring to the drawings, 1 designates a horizontal base frame comprising parallel longitudinal side bars 2 and 3, connected at intervals by transverse rods or bars 4. Supported by said horizontal base or main frame is an upright frame formed of front, rear and intermediate pairs of standards 5, 6 and 7, the standards of each pair being connected by cross pieces 8 and suitably reinforced from the frame. Said standards are provided with depending extensions 9, and carry at their upper ends the supporting surface of the machine, said supporting surface comprising a frame with a covering of canvas or other suitable fabric. This supporting surface embodies a main plane extending lengthwise parallel with the line of flight, and formed of a central portion 10, lateral extensions or wings 11 and front and rear wing tips 12 and 13. The body

10 of the plane and its lateral wings 11 may be flat or curved from front to rear for an effective dynamical reaction of the air thereon, and in accordance with my invention the wings 11 preferably incline at a dihedral angle, while the body 10 is concavo-convex in form longitudinally and transversely to provide an air channel or pocket in which the air pressure is concentrated to secure an increased lift and promote the stability of the machine, as well as to prevent it from skidding. The wing tips 12 and 13 conform in contour to the body 10 and are adapted to be flexed or warped, as hereinafter described.

The machine is provided with front and rear pairs of cushioned supporting wheels 14 and 15, which are journaled upon front and rear transverse axles 16 and 17. These axles are fitted to slide vertically in guide slots 18 formed in the depending extensions 9 of the front and rear standards. Carried by said extensions are skids or runners 19, below which the wheels normally project. Cushioning springs 20 bear at their free ends against the axles and are secured at their opposite ends by clips 21 to the frame bars 2 and 3, said springs being provided intermediate their ends with coils 22. When the machine strikes the surface of the ground in landing, or runs over a rough ground surface, the springs permit the wheels to yield up to the line of the skids to secure a cushioning action and permit the skids to come into play in the landing operation to bring the machine to a quick stop. Secured to the front axle is a bracket plate 23, to which is fixed the lower end of a rod 24 projecting through and slidable in a guide 25 carried by the frame, to reinforce the front axle in its sliding movements. The upper end of the rod is provided with an angularly bent stop portion 26 which normally rests upon one of the cross bars 4 and is adapted to engage the same to prevent too violent downward movement of the front wheels and strain upon the axle 16 when the wheels violently react after contact with the ground or in running over abrupt irregularities of surface.

The propelling mechanism comprises a motor 27 supported upon the base frame in line with the center of gravity and having its shaft extending rearwardly and carrying a drive sprocket 28. Journaled upon the cross bars of the rear sets of standards is a longitudinally extending propeller shaft 29 carrying front and rear propellers 31 and 32, the blades of which are set on lines between each other so that they will exert a continuous thrust pressure on the air. The shaft 29 carries a pinion 33 driven from the sprocket wheel 28 by a chain 34.

Suitably supported at the rear of the machine beneath the wing tip 13 is a vertical or direction rudder 35 to which are connected the rear ends of a pair of cables 36. These cables extend forwardly over suitable guide pulleys and are oppositely wound at their forward ends upon a drum 37, so that by turning the drum in one direction or the other the rudder may be adjusted to steer the machine to the right or left. The drum is mounted upon a longitudinally extending control shaft 38 having at its rear end a hand wheel 39 disposed in proximity to the aviator's seat 40. Said shaft is journaled and slidably mounted in suitable bearings on spaced brackets 41 supported from the base frame, so that the shaft may both oscillate laterally and slide in a fore and aft direction.

Fulcrumed upon the front cross bar of the base frame at a point intermediate of its length is a lever 42, the upper arm of which is connected by a link 43 with the front wing tip 12 and the lower arm of which is connected with a rod or link 44 slotted to slidably engage the guide rod 24 and connected at its rear end with one or more cables 45 leading from suitable guide pulleys to the rear wing tip 13. The upper arm of the lever 42 is provided with a slotted portion 46 slidably engaged by a cross pin upon a collar or head 47 swiveled to the control shaft, so that said shaft may be turned laterally without affecting the lever, while by sliding the shaft longitudinally the lever will be rocked forwardly or rearwardly. By rocking the lever in one direction the wing tips 12 and 13 will be drawn down or warped to increase their angle of incidence, while by rocking the lever in the opposite direction the wings will be permitted to move upwardly to a decreased angle of incidence. Hence the said wing tips may be adjusted to vary the lifting power of the machine, as well as to steer the machine in a vertical plane, and to control the longitudinal balance of the machine.

From the foregoing description, the construction and mode of operation of my improved flying machine will be readily understood by those versed in the art, and it will

be seen that the construction described provides a machine of a simple type which is light in weight and readily and conveniently controlled. Also it will be seen that by means of the described construction of the supporting surface a machine is provided which will maintain a direct course of flight and is adapted to balance itself automatically in the air to an effective degree.

Having thus described the invention, what I claim as new is:—

1. A flying machine embodying a frame, a supporting surface having front and rear flexible wing tips, a lever intermediately fulcrumed on the frame for a fore and aft swinging movement, said lever having a slotted arm, connections between the arms of the lever and the respective wing tips, a longitudinally slidable and rotatable control shaft, a head swiveled to said shaft and having a projection engaging the slotted arm of the lever, means for rotating and sliding said control shaft, a vertical rudder, and means actuated by the rotary movements of the shafts for adjusting said rudder.

2. A flying machine embodying a frame including a platform, a supporting plane above the platform and having front and rear flexible wing tips, standards rising from the platform and provided with bearings, a shaft slidable and rotatable in said bearings, a vertically disposed intermediately pivoted lever having an upper longitudinally slotted arm and having its lower arm projecting below the platform, a link directly connecting the upper arm of the lever with the front wing tip, a link connected with the lower arm of the lever and disposed beneath the platform, a flexible connection between said link and the rear wing tip, a head swiveled to said shaft and having a projection engaging the slotted arm of the lever, a drum mounted on said shaft, a vertical rudder, and a cable wound reversely on the drum and connecting the same with the vertical rudder.

3. A flying machine embodying a frame, a vertical rudder, a supporting surface having front and rear flexible wing tips, a lever intermediately fulcrumed on the frame for a fore and aft swinging movement, said lever having a slotted arm, connections between the arms of the lever and the respective wing tips, a longitudinally slidable and rotatable control shaft, a head swiveled to said shaft and having a projection engaging the slotted arm of the lever, a drum mounted on said shaft, and a cable wound reversely on the drum and connecting the same with the vertical rudder.

4. A flying machine having a supporting surface comprising a body portion of approximately oblong rectangular form in plan and longitudinally or transversely

bowed or curved, correspondingly curved
flexible wing tips at the front and rear of
said body portion and coextensive in size
with each other, and longitudinally and
transversely bowed or curved wings at the
5 sides of the body portion and fixed with
relation thereto, said wings being coexten-
sive in size with each other and inclined in

an upward and outward direction with rela-
tion to the body portion.

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

GUSTAVE F. EKLUND.

Witnesses:

PETER BOLTON,
BERNARD MAGUIRE.