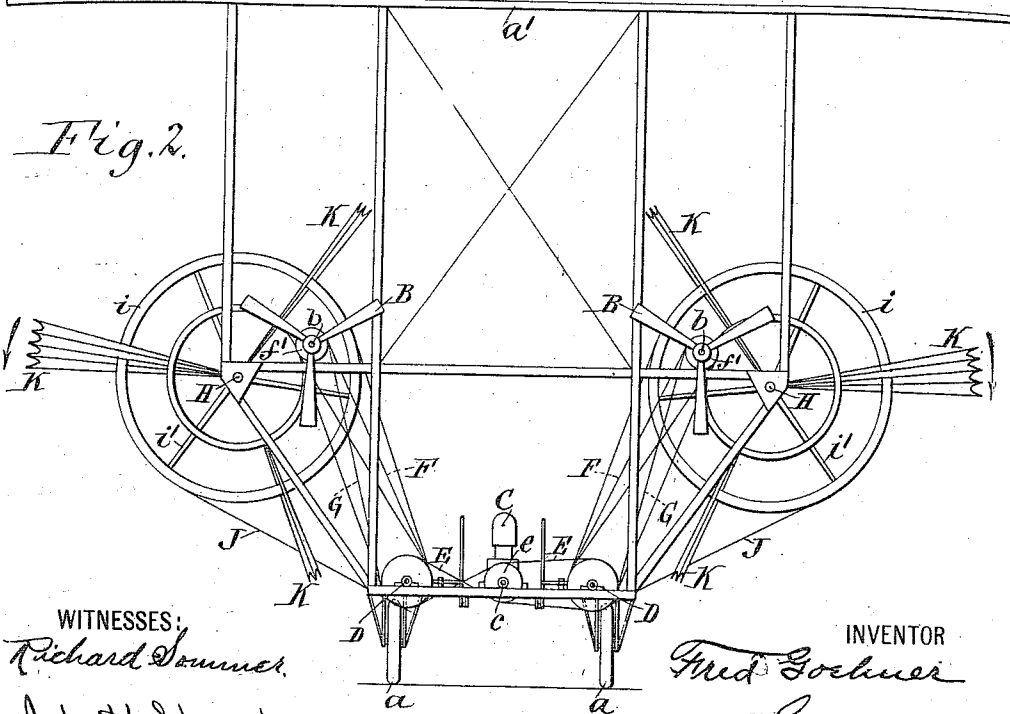
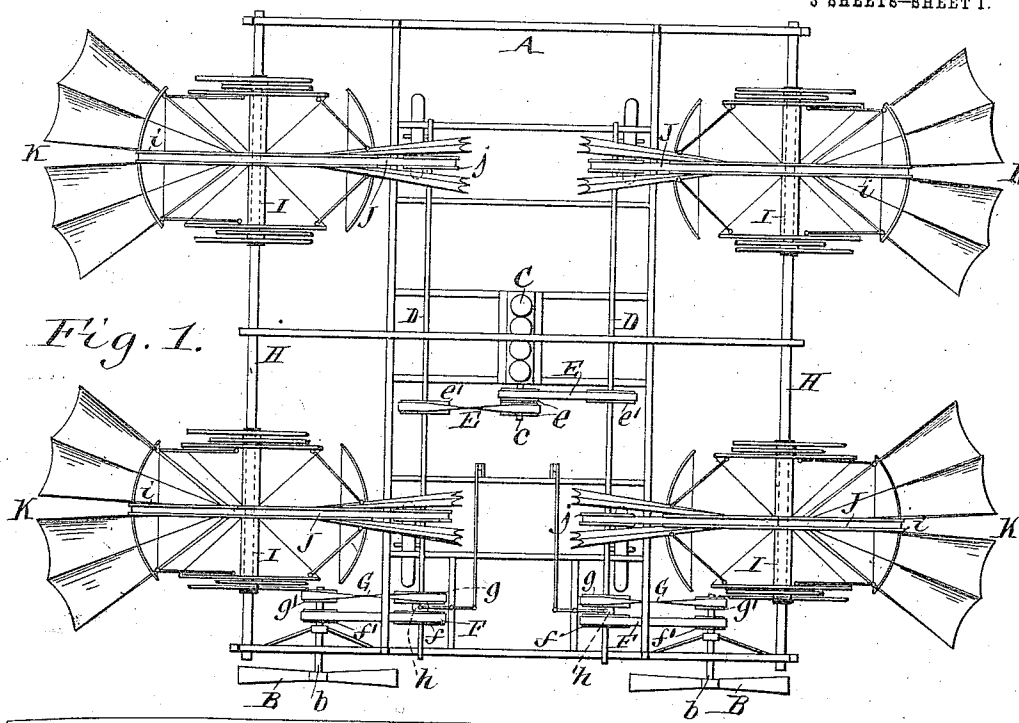


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F. GOEHNER.
FLYING MACHINE.
APPLICATION FILED SEPT. 27, 1909.

Patented Dec. 27, 1910.

3 SHEETS—SHEET 1.



WITNESSES:
Richard Sommer.
John H. Shoemaker.

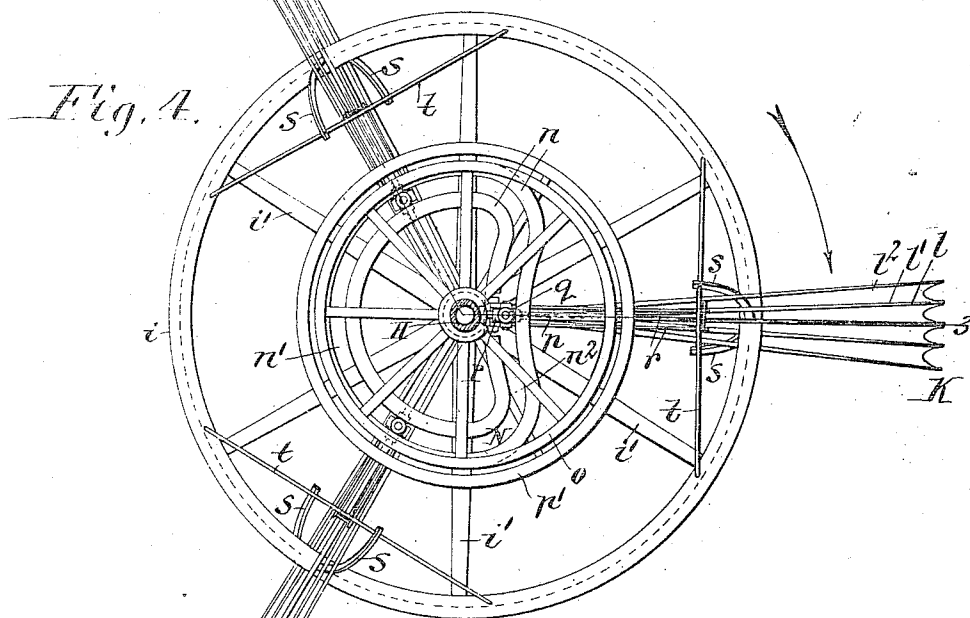
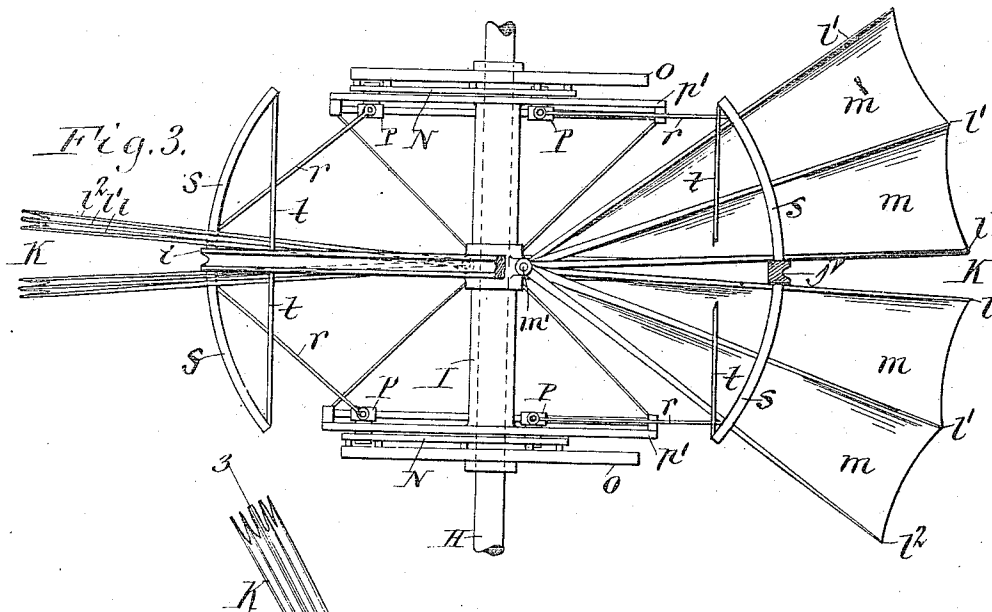
INVENTOR
Fred Goehner
BY *Leyer & Papp*
ATTORNEYS.

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3 SHEETS-SHEET 2.



WITNESSES:

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INVENTOR

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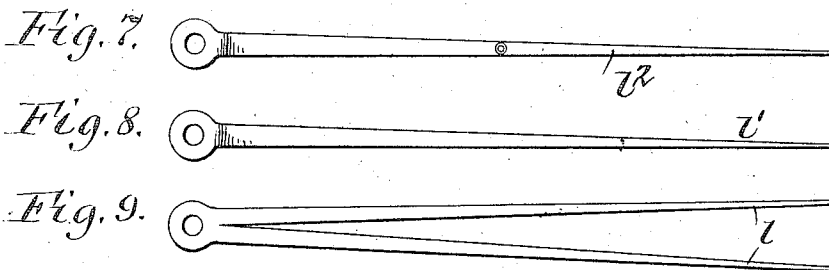
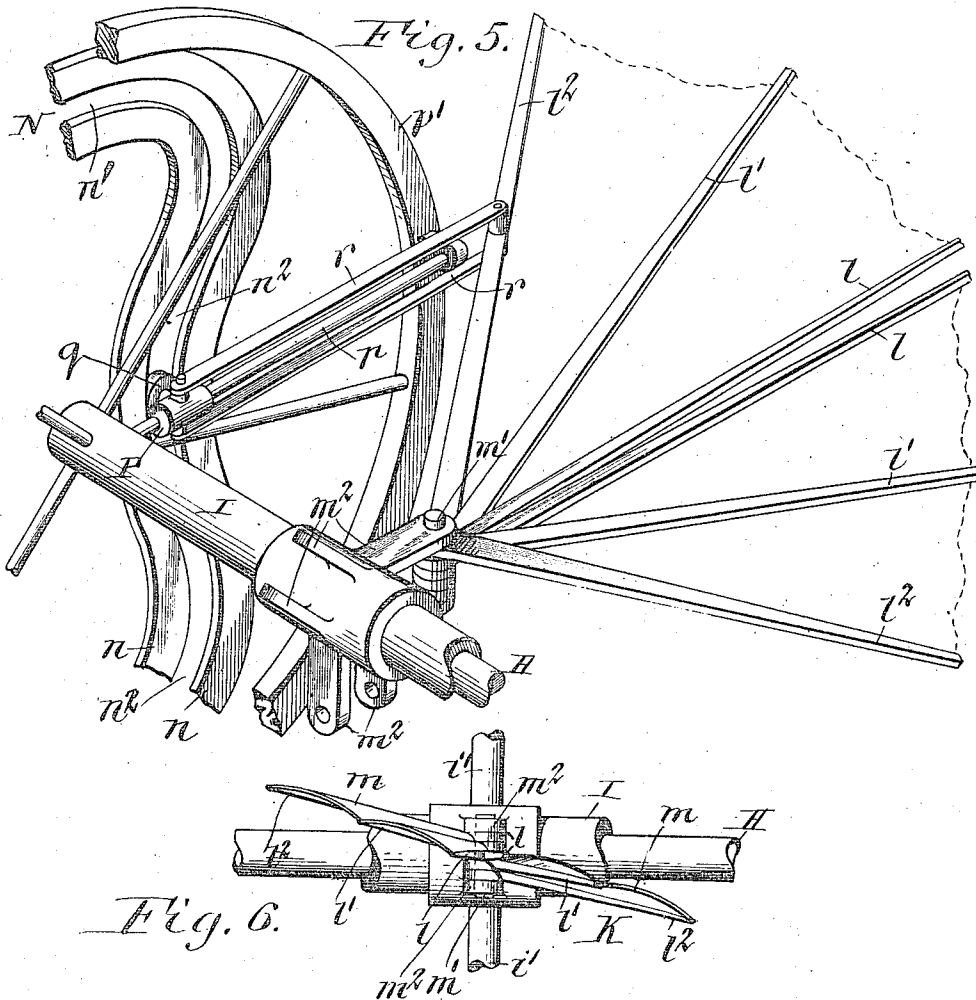
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3 SHEETS—SHEET 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRED GOEHNER, OF BUFFALO, NEW YORK.

FLYING-MACHINE.

979,472.

Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed September 27, 1909. Serial No. 519,744.

To all whom it may concern:

Be it known that I, FRED GOEHNER, a subject of the Emperor of Germany, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to a flying machine of that class in which the lifting of the machine is effected by rotatable feathering wings or blades and has the object to produce a machine of this character, so that the maximum strength, power and lightness is obtained for lifting and propelling a given load.

In the accompanying drawings consisting of 3 sheets: Figure 1 is a top plan view of my improved flying machine, with the top omitted. Fig. 2 is a rear elevation of the same. Fig. 3 is a fragmentary longitudinal vertical section on an enlarged scale, of one of the lifting devices taken in line 3-3, Fig. 4. Fig. 4 is a sectional rear elevation of the same. Fig. 5 is a fragmentary perspective view of one of the wing shifting devices. Fig. 6 is an end view of the ribs or arms of one of the wings and adjacent parts. Figs. 7, 8 and 9 are detached views of the central, intermediate and outer arms or ribs of the wings.

Similar letters of reference indicate corresponding parts throughout the several views.

A represents the main frame of the machine which may be of any suitable construction to support the working parts of the machine, it being understood that strength, lightness and a minimum of head resistance to the wind are essential. On its underside the frame is provided with wheels *a, a* whereby the same is supported on the ground while the machine is at rest or when the same starts its flight or alights after a flight. At the top the frame is also provided with a horizontal roof *a'* which operates to protect the operator from the sun and rain, and also checks the descent of the machine in case of an accident, and also operates as a plane for gliding through the air. At the rear of the frame are arranged the principal means for propelling the machine horizontally, these means consisting preferably of two vertically rotatable propellers B, B which are arranged on opposite sides of the longitudinal center of the machine and mounted on the

rear ends of horizontal longitudinal shafts *b* which are journaled in suitable bearings on the main frame. These propellers may be driven in any suitable manner but preferably by the means which are shown in Figs. 1 and 2, and which comprise an internal combustion engine C arranged in the central lower part of the frame, two horizontal driving shafts D, D journaled lengthwise in suitable bearings on the frame between opposite sides of the engine and the propeller shafts, two belts E each passing around pulleys *e, e'* arranged respectively on the engine shaft *c* and one of the driving shafts, two straight belts F each passing around a driving pulley *f* on one of the driving shafts and a driven pulley *f'* on the adjacent propeller shaft, two cross belts G each passing around a driving pulley *g* on one of the driving shafts and a driven pulley *g'* on the adjacent propeller shaft, and two clutches *h, h'* each of which is adapted to connect one of the driving shafts either with the straight belt driving pulley *f* or the cross belt driving pulley *g* thereon.

When the clutches connect both driving shafts with their straight belt driving pulleys then both propellers are turned forwardly and the machine moves straight ahead but if one driving shaft is connected with its straight driving belt pulley and the other driving shaft is connected with its cross belt driving pulley, one propeller will be turned forwardly and the other backwardly, thereby causing the machine to turn to one side, the mechanism being used in this manner for steering the machine.

The lifting of the machine in the air is effected by means of my improved lifting or vertical propelling device. The number of such lifting devices may be varied depending on the size of the machine and the load to be carried but as shown in the drawings four such lifting devices are employed, two being arranged on each side of the longitudinal center of the machine and one in front of the other. The lifting devices on the same side of the machine are mounted on a stationary horizontal rod or shaft H which is mounted lengthwise on the frame in any suitable manner.

Each of the lifting devices is preferably constructed as follows: I represents a hub or sleeve turning on the stationary rod or shaft H and *i* is a circular rim which is con-

nected by arms i^1 with the hub i , these parts
 together forming practically a driven sup-
 porting wheel or pulley which is rotated
 vertically in the direction of the arrow pre-
 5 erably by means of a belt J passing around
 a driving pulley j on the adjacent driving
 shaft D and a peripheral groove j^1 in the
 rim of the driven wheel I , i , i^1 . Circum-
 10 ferentially and equidistant around this sup-
 porting wheel are arranged a plurality of
 lifting wings or beaters K , three of such
 wings being shown in the drawings and each
 being adapted to unfold and catch the air
 15 on the descending side of the supporting
 wheel and fold and feather through the air
 on the ascending side of said wheel, so as to
 produce a lifting effect on the machine. Each
 of these wings preferably consists of two sec-
 20 tions which are arranged on opposite sides of
 the wheel rim i and spokes i^1 each section
 comprising inner, intermediate and outer ra-
 dial arms or ribs l , l^1 , l^2 and flexible webs m of
 fabric or other suitable material connecting
 said arms. The inner ends of these several arms
 25 of the two sections of each wing are secured
 to the adjacent central part of the hub I by
 means of a tangential pin, bolt or screw m^1
 which is supported at its opposite ends by
 means of lugs m^2 projecting laterally from
 30 the hub. The inner arm l of both wing sec-
 tions are preferably stationary relative to
 the supporting wheel and are secured to
 opposite sides of the rim i thereof while the
 intermediate and outer arms l^1 , l^2 thereof
 35 are capable of swinging laterally on the pin
 m^1 as a pivot toward and from the inner
 arms, for the purpose of spreading or col-
 lapsing the webs between the same in the
 manner of an accordion. The wings are
 40 spread on the descending side of the sup-
 porting wheel so as to produce a downward
 pressure against the air and lift the machine,
 while on the ascending side of this wheel the
 wings are folded or collapsed so as to present
 45 a minimum surface and resistance to the air
 on this side of the wheel.

In order to cause the wings while turn-
 ing in a spreadout condition to produce
 not only a lifting effect, but also a forward
 50 propelling effect, the several arms of each
 wing are mounted successively upon each
 other on the pivot pin m^1 , the foremost arm
 being lowest and the rearmost arm highest,
 thereby causing the underside of the wing
 55 to be inclined upward from its front toward
 its rear edge, as shown in Fig. 6, whereby the
 above mentioned effect is produced. This
 inclination of the underside of the wings is
 further increased by deflecting the outer
 60 parts of the outer and intermediate arms l^2 ,
 l^1 of the front section downwardly and de-
 flecting the outer ends of the outer and in-
 termediate arms l^2 , l^1 of the rear section of
 each wing upwardly relatively to their pivots,
 65 as shown in Figs. 4 and 6. The inner arms

of both wing sections are preferably formed
 integrally and arranged side by side in the
 same plane, as shown in Figs. 6 and 9.

The opening and closing of the wings may
 be effected by various means but those shown 70
 in the drawings are preferred and construct-
 ed as follows:— N , N represent two station-
 ary cams arranged respectively at opposite
 ends of the hub of the supporting wheel and
 each preferably constructed of two cam bars 75
 n , n arranged side by side so as to form a
 cam slot between them which has a high con-
 centric portion n^1 on the rising side of the
 supporting wheel and a low or receding cam
 portion n^2 on the descending side of said 80
 wheel. The cam bars are supported on the
 adjacent supporting shaft D by a stationary
 head o which is preferably constructed in
 the form of a spider or open work frame.
 85 P represents radially movable slides pref-
 erably of tubular or sleeve form and each
 guided on a radial guide rod p which is se-
 cured at its inner end to the hub of the sup-
 porting wheel. If desired, the outer ends
 of the several guide rods on the same side 90
 of the supporting wheel may be connected
 by a ring p^1 , as shown in the drawings.
 Each of the slides P is provided on its outer
 side with a projection or roller q which
 95 works in the slot of the adjacent cam. Each
 slide is also connected on opposite sides of
 its guide rod by two links r , r with the cen-
 tral part of the outer arm of the adjacent
 wing section. As the lifting device turns in
 the direction of the arrow in Figs. 3 and 5, 100
 the slides while moving upwardly are shifted
 radially outward by the high concentric
 parts of the cams, whereby the arms of the
 corresponding wing are folded and rendered
 inoperative and as the slides move down- 105
 wardly the same are drawn inwardly by the
 low or receding part of the cams, thereby
 unfolding the arms of the respective wings
 and rendering the same operative.

For the purpose of sustaining the arms 110
 of the wings when the same are spread and
 carrying the load each of the wings is sus-
 tained on its rear or trailing side by a back
 support comprising preferably two curved
 retaining arms s , s which project from op- 115
 posite sides of the rim of the supporting
 wheel and engage with the rear sides of the
 central parts of the arms of the sections of
 the respective wing, whereby the latter when
 spread are firmly supported across the en- 120
 tire width thereof and the greatest efficiency
 of the same is obtained. The outer ends of
 the retaining arms are preferably connect-
 ed by rearwardly extending guy wires t with
 the rim of the supporting wheel so as to 125
 hold these arms in place.

I claim as my invention:—

1. A flying machine comprising a lifting
 device having a vertically rotatable sup-
 port, wings mounted on said support and 130

each having arms pivoted on said support and webs connecting said arms, and operating means for separating said arms for unfolding the wings on the descending side of said support and gathering said arms for folding the wings on the ascending side of said support, said operating means comprising a stationary cam, radially movable slides engaging with said cams, and links connecting said slides with some of said arms.

2. A flying machine comprising a lifting device having a vertically rotatable support, wings mounted on said support and each having arms pivoted on said support and webs connecting said arms, and operating means for separating said arms for unfolding the wings on the descending side of said support and gathering said arms for folding the wings on the ascending side of said support, said operating means comprising a stationary cam, radially movable slides engaging with said cams, links connecting said slides with some of said arms and radial rods which are mounted on said support and on which said slides are guided.

3. A flying machine comprising a lifting

device having a vertically rotatable wheel, a plurality of wings mounted on said wheel and each composed of sections arranged on opposite sides of the wheel and having an inner arm fixed on said wheel, intermediate and outer arms pivoted on the wheel, and webs connecting said arms, the arms of each wing being successively one above the other so that the underside of the wing inclines upwardly from its front edge toward its rear edge, and means for folding and unfolding said wings.

4. A flying machine comprising a vertically rotatable support, wings arranged on said support and adapted to be unfolded on the descending side of said support and folded on the ascending side of said support, the underside of said wings being inclined from their front edges upwardly toward their rear edges.

Witness my hand this 22 day of September, 1909.

FRED GOEHNER.

Witnesses:

JOSEPH E. RYAN,

WALTER K. HOLZMUELLER.