O. HASELAU.

FLYING MACHINE.

APPLICATION FILED MAY 3, 1909. RENEWED OCT. 21, 1910.

991,846.

Patented May 9, 1911.

4 SHEETS—SHEET 1.

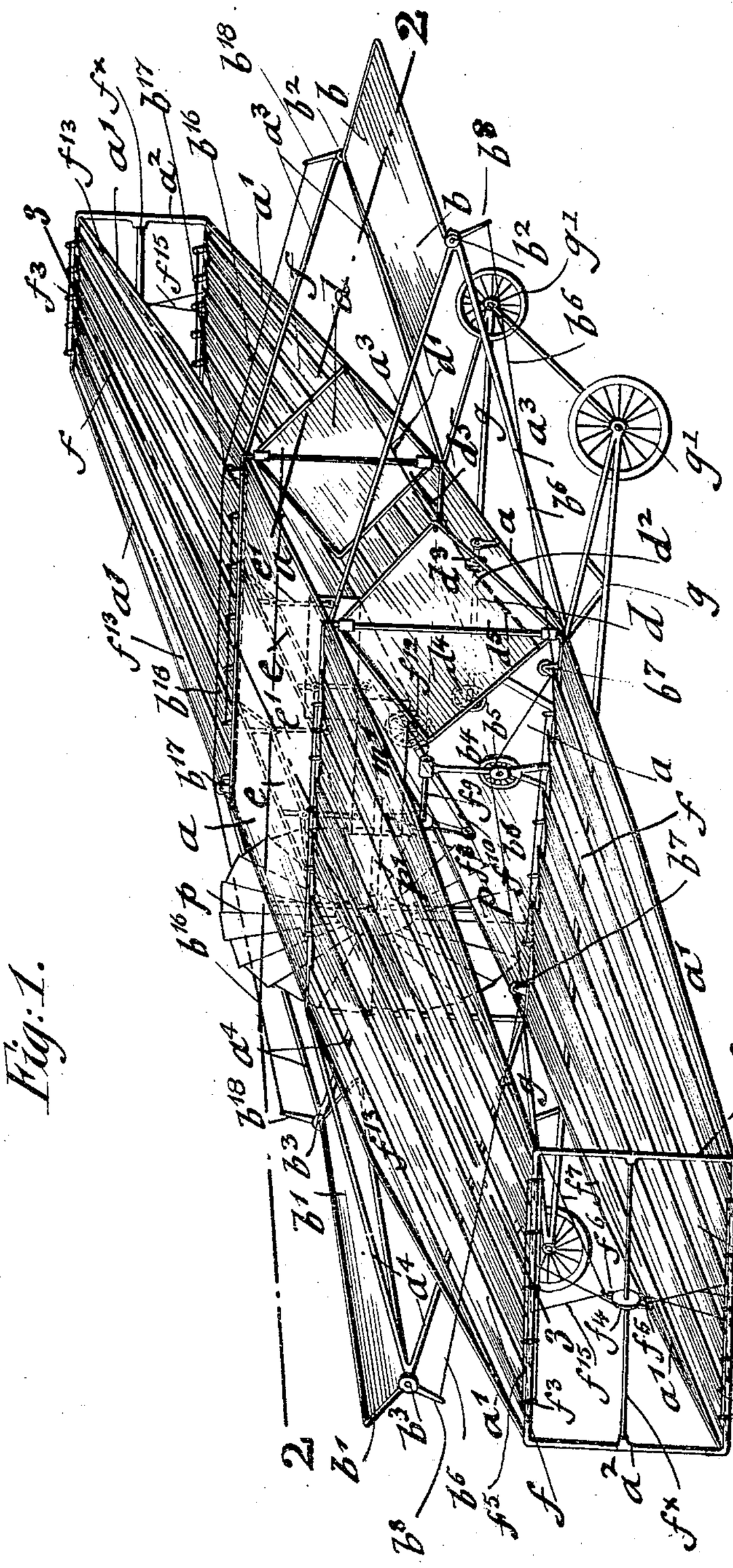

Fig. 1.

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4 SHEETS—SHEET 2.

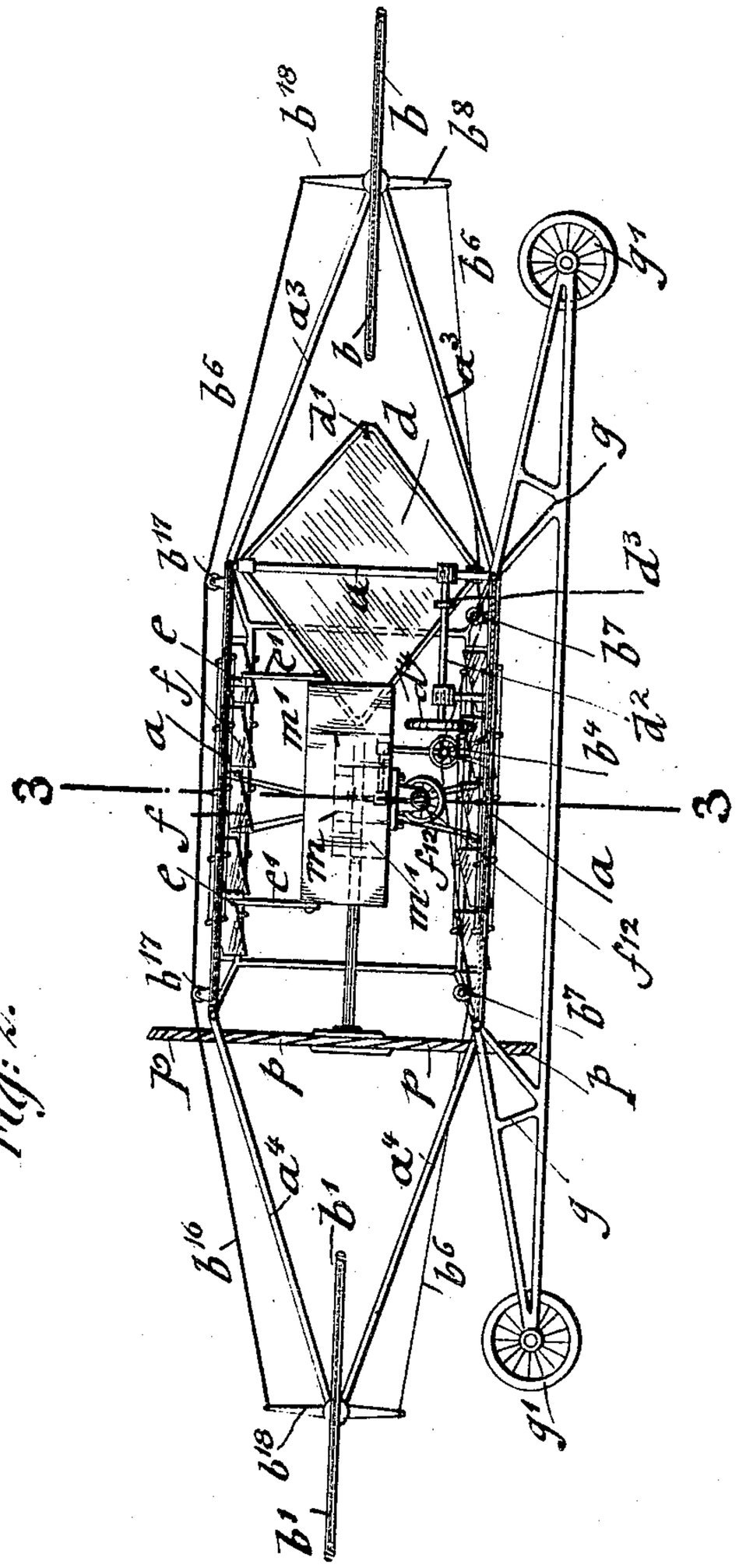

Fig: 2.

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4 SHEETS—SHEET 3.

Fig: 4.

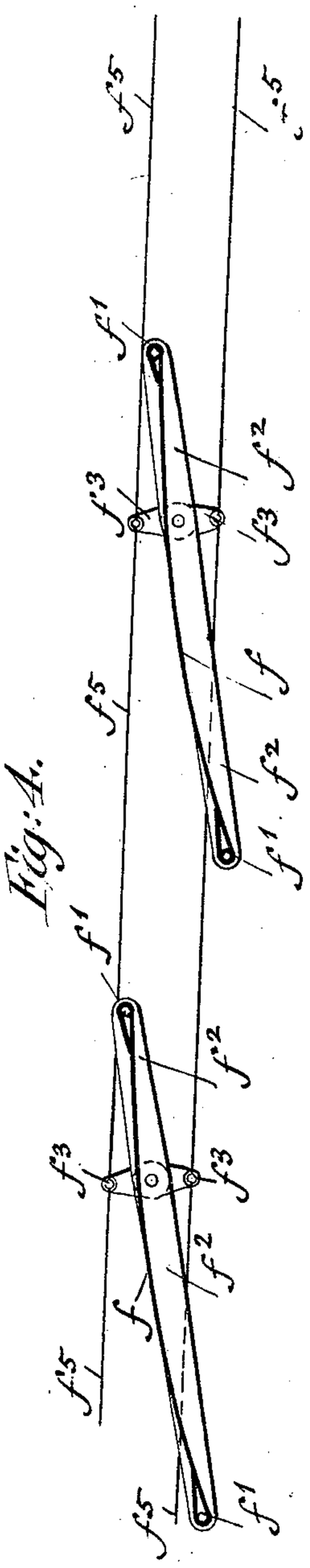
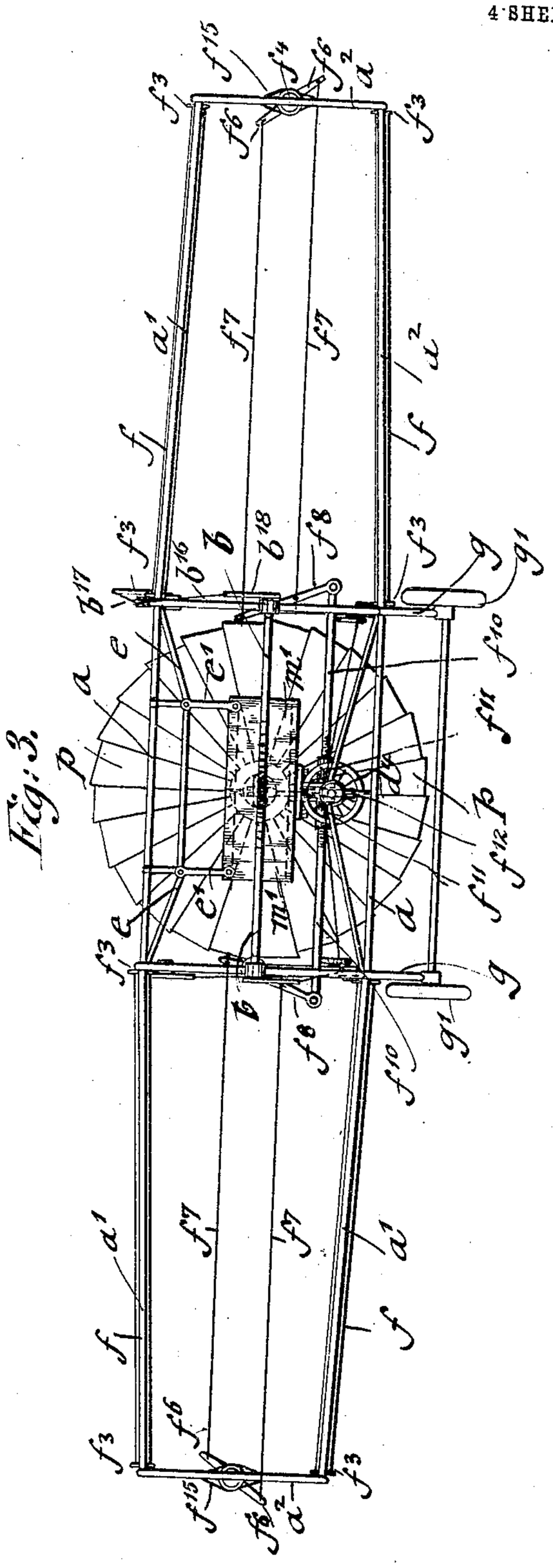


Fig: 3.



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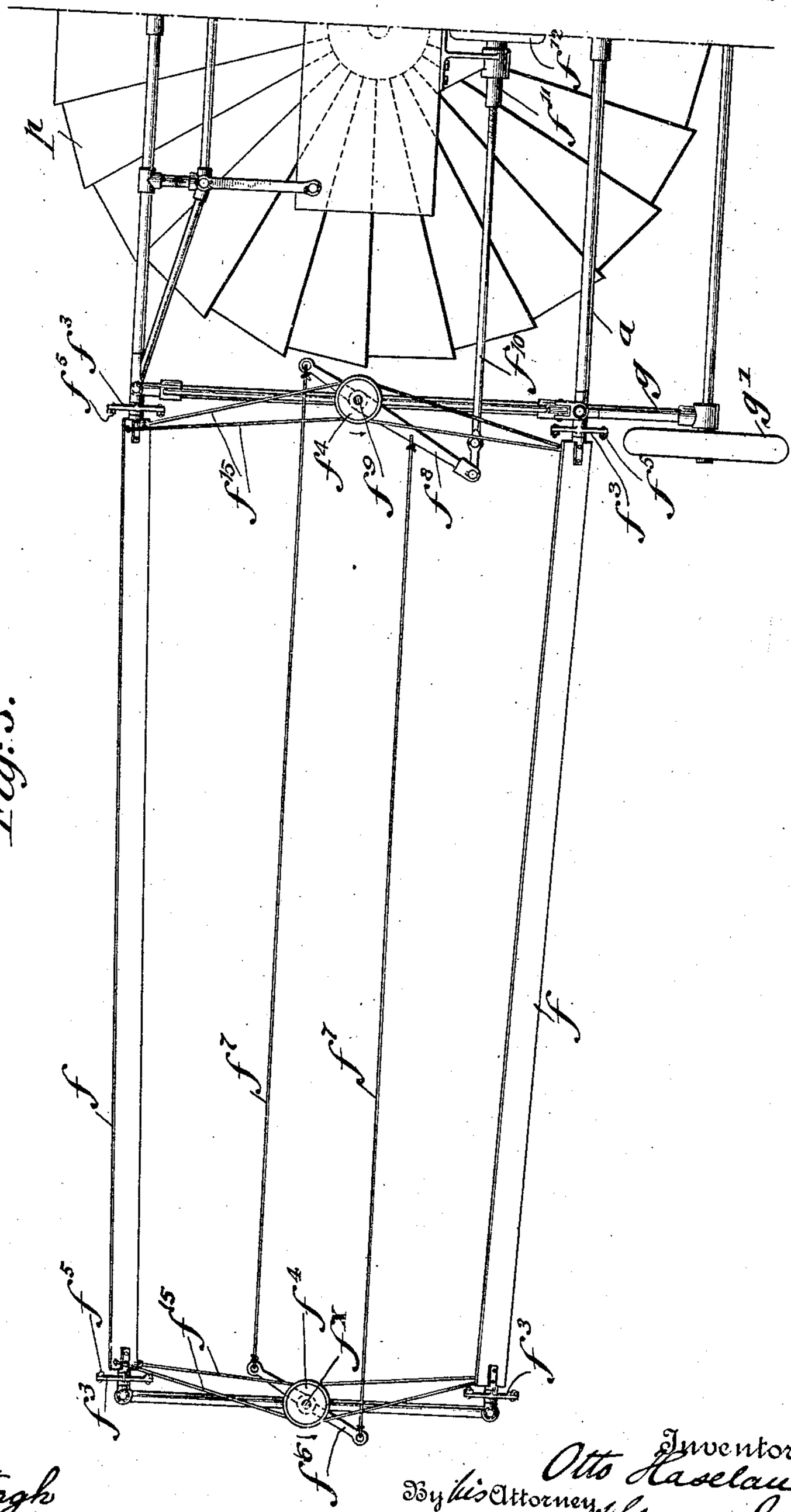

Fig. 5.

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UNITED STATES PATENT OFFICE.

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FLYING-MACHINE.

991,846. Specification of Letters Patent. Patented May 9, 1911.

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To all whom it may concern:

Be it known that I, OTTO HASELAU, a citizen of the United States of America, residing in New York, in the borough of the Bronx, county and State of New York, have invented certain new and useful Improvements in Flying-Machines, of which the following is a specification.

This invention relates to an improved flying machine which is constructed on the basis of a double aeroplane and provided with laterally-extending wings having automatically-adjustable feathers and the usual propelling and steering devices; and the invention consists of a flying machine comprising a rectangular supporting center-frame closed at the top and bottom, converging frames extending at both sides of the center-frame, and tapering front and rear-frames for the front and rear steering planes, the laterally-extending side-frames being provided with a plurality of tiltable feathers that are automatically operated from the motor-frame which is suspended from the center-frame so as to swing laterally, but which is prevented from swinging in a direction at right angles thereto in connection with intermediate actuating mechanism.

The invention consists further of the connection with the motor-frame and motor of a propeller, the shaft of which is connected with the motor-shaft; and the invention consists lastly of certain details of construction and combinations of parts which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a perspective view of my improved aeroplane flying machine, Fig. 2 is a vertical longitudinal section on line 2, 2, Fig. 1, Fig. 3 is a vertical transverse section on line 3, 3, Fig. 2, Fig. 4 is a detail section of the adjustable feathers located in the lateral extensions of the top and bottom wings of the flying machine, and Fig. 5 is an enlarged view of half of the section taken on the line 3—3 of Fig. 2.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, *a* represents the center-frame of my improved flying machine. The center-frame *a* is made rectangular in shape and closed at the top and bottom by sheet-metal or other plates, the frame being constructed of suitable tubes connected by aluminum corner-pieces. At both sides of the center-frame *a*, and in one plane with the top and bottom of the same, are arranged extension-frames a^1, the sides of which converge toward vertical oblong frames a^2 at their outer ends. The center-frame *a* is also provided at its front and rear-ends with forwardly and backwardly extending portions a^3, a^4 having converging sides, and which carry at their apices the bearings for the horizontal front and rear steering planes *b*, b^1. The front steering plane *b* is preferably made rectangular and pivoted by short shafts b^2 at its diagonally-opposite corners to the converging front-frames a^3, while the rear steering plane b^1 is also supported by short shafts b^3 at diagonal corners in bearings of the rear-frames a^4, as shown clearly in Figs. 1 and 2. To the vertical front-rods of the center-frame *a* are applied vertical steering planes *d*, one at each side of the frame. The horizontal and vertical steering-planes *b*, b^1 and *d* are made of frames of suitable tubing and webs of sheet-metal or other suitable material. The horizontal front and rear steering-planes *b*, b^1 are operated from the seat of the operator by means of a hand steering wheel b^4, which is connected by winding-up pulleys b^5 with steel wire-cords b^6, passing over guide-pulleys b^7 to crankarms b^8 on the pivot-shafts b^2, b^3 of the front and rear-steering planes. A wire-cord b^{16} passing over guide-pulleys b^{17} at the upper part of the frame *a* connects the outer ends of cranks b^{18} at the corners of the planes *b*, b^1 opposite from the cranks b^8. This cord b^{16} serves to move the planes *b*, b^1 back against the action of the cord b^6. The vertical steering planes *d* are connected at their front-corners by a pivot-rod d^1 and moved to the right or left hand by a double winding-up pulley d^3, the shaft d^2 of which turns in bearings supported on the bottom of the frame *a*, said winding-up pulley d^3 being connected by wire-cords d^5 with the outer ends of the frames of the vertical steering planes *d* and operated by a hand-wheel d^4 at the inner end of the shaft d^2, as shown in Fig. 1.

The center-frame *a* is stiffened at its upper part by two transverse truss-braces *e* to which are loosely pivoted pendant rods e^1, the lower eye-shaped ends of which are pivoted to the front and rear-ends of a casing m^1 containing a motor *m* of any approved construction. The upper ends of the

suspension-rods e^1 are pivoted to the lower part of the truss-braces e, in such a manner that the motor-casing can swing in a lateral direction, but not in a direction at right angles thereto. The driving-shaft s of the motor extends through the rear-wall of the motor-casing and is provided with a propeller p.

Laterally-extending from the top and bottom-planes of the center-frame a are arranged in the side-frames a^1 a plurality of parallel feathers f, which are pivoted at their inner and outer ends to the upper and lower rods of the center-frame and end side-frame a^2. In the drawings five parallel feathers are shown, but it is intended in a full-size flying machine to use about fifteen or more feathers according to the size of the same. The feathers f are all of the same size and are made of thin sheets of aluminum which are bent at their ends around two transverse steel-wires f^1 which are always held under tension, as shown in Fig. 4. The transverse steel-wires are supported by longitudinal parallel levers f^2, also of aluminum, which are provided at about one-third of their length from their upper ends with short crank-arms f^3 having hubs that are pivoted to the upper and lower horizontal rods of the center and side-frames, while the crank-arms f^3 are connected with steel-wire cords f^5, (see Fig. 5). Cords f^{15} attached to the two corners at each end of one feather f of both top and both bottom planes are guided over suitable pulleys f^4 located at the center of each end of each outer side-frame a^2. The cords f^{15} are crossed before being passed around the pulleys f^4, which are supported on horizontal shafts f^x turning in bearings of the outer side-frames a^2, and shafts f^9 located in suitable bearings on the center-frame a. To the shafts f^x are applied crank-arms f^6 which are connected by wire-cords f^7 with crank-arms f^8 applied to the shaft f^9, the lower crank-arms f^8 being connected by pivot-rods f^{10} having threaded ends engaging in opposite ends of the right and left threaded sleeve f^{11} on the hub of a hand-wheel f^{12} turning in central hanger-bearings at the bottom of the motor-casing m^1, said handwheel being adapted to set simultaneously both the left-hand set of feathers and the right-hand set of feathers in the same direction manually by the operator. The swinging motion of the motor-casing m^1 causes the position of the feathers to be changed by the intermediate motion-transmitting mechanism, so that the angle of the same with the plane of the side-frames is increased or diminished according to the greater or smaller swinging motion of the motor-casing to one side or the other of the center-plane of the machine. By turning the hand-wheel f^{12}, the angle of the feathers can be changed so as to correspond with the speed, respectively with the load the machine is carrying. When a gust of wind should strike the side extension-frames on the right hand side so as to raise the same, the motor-casing would be swung out of line with the longitudinal center-plane of the machine and would thereby decrease the angle of the feathers with the horizontal plane on the raised side of the machine, while the angle of the feathers on the side extension-frames at the depressed side of the machine would have the angle of the feathers increased. This would cause the side extension-planes on the lower side of the machine to be raised and the side extension-planes on the higher side to be lowered, so as to produce thereby automatically the balancing of the machine.

A flying machine with a single large aeroplane can only be controlled under very favorable weather conditions, as there is always the possibility of the wind striking one of the wings with great force at an angle of 90°, which requires that the machine be constructed in such a way that the area of the plane can be reduced from a surface area of 100% down to 5% at a moment's notice. This of course is almost impossible with a single aeroplane, so that the machine would lose its balance and be upset. This great objection is entirely overcome in the flying machine described, for the reason that the slightest irregularity in wind-pressure causes the feathers to adjust themselves automatically so as to offer a greater or smaller area for the wind to act upon; but there are other advantages which are gained by adopting narrow feathers and arranging them in two planes, one above the other, namely, that the surface of resistance becomes considerably smaller, that higher speeds are possible, and also that a greater lifting power can be developed. It also divides up the center of pressure into as many centers as there are extension-planes, whereby a uniform lift is imparted to the machine, which cannot be accomplished by a single or double aeroplane flying machine, in which the shifting of the center of pressure tends to cause the flying machine to lose its balance.

Along both sides of the converging frames of the side-extension-planes are arranged fixed stationary feathers f^{13} of triangular shape. Between these fixed triangular side feathers, the plurality of tiltable feathers is arranged, as the space can be divided up so as to contain any desired number of tiltable feathers of equal size.

From the foregoing it appears that the improved flying machine has the advantage of being readily balanced under any wind-pressure by the swinging motion of the suspended motor-casing and the tiltable feathers located in the upper and lower laterally-

extending side-planes. This leaves the operator free to attend to the propelling and steering mechanisms, which are of the well-known construction. To the bottom of the center-frame are applied longitudinal parallel truss-frames g, the front and rear-ends of which are provided with axles for supporting the hubs of four wheels g^1 on which the flying machine is supported when on the ground. By means of the wheels the flying machine is started, a certain momentum being given by the starting motion of the propeller, so that the lifting action can take place in connection with the horizontal steering planes while the steering from one side to the other is accomplished by the vertical steering planes.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A flying machine consisting of a center-frame closed at the top and bottom, extension side-frames at both sides of both top and bottom planes of the center-frame, a motor-casing suspended from the top of the center frame, the motor-casing being capable of laterally-swinging motion but prevented from moving in a direction at right angels thereto, a plurality of tiltable feathers located in the upper and lower extension side-frames and intermediate mechanisms connecting both ends of the tiltable feathers with the motor-casing for permitting the automatic adjustment of the feathers by the tilting motion of the motor-casing.

2. A flying machine consisting of a prismatic central frame closed at the top and bottom, pairs of upper and lower side-frames extending laterally from the top and bottom of the central frame and having end frames for holding them in spaced relation, stationary feathers at the front and rear sides of the upper and lower side-frames, a plurality of transversely extending tiltable feathers suspended in the upper and lower side-frames between the outer and inner end pieces thereof, a motor casing pivotally suspended from the central frame, and intermediate mechanism connecting the tiltable feathers with said motor casing for tilting said feathers when said motor swings.

3. A flying machine consisting of a prismatic central frame closed at the top and bottom, pairs of upper and lower side-frames extending laterally from the top and bottom of the central frame and having end frames for holding them in spaced relation, stationary feathers at the front and rear sides of the upper and lower side-frames, a plurality of transversely extending tiltable feathers suspended in the upper and lower side-frames between the outer and inner end pieces thereof, a motor casing pivotally suspended from the central frame, and intermediate mechanism carried by said casing and said frame and connecting said casing and said tiltable feathers for oscillating said feathers on opposite sides in opposite directions to each other as said casing swings, said mechanism being also adapted for manually adjusting the inclination of said tiltable feathers with respect to said side-frames simultaneously in the same direction.

4. A flying machine consisting of a prismatic central frame closed at the top and bottom, pairs of upper and lower side-frames extending laterally from the top and bottom of the central frame and having end frames for holding them in spaced relation, stationary feathers at the front and rear sides of the upper and lower side-frames, a plurality of transversely extending tiltable feathers suspended in the upper and lower side-frames between the outer and inner end pieces thereof, a motor casing pivotally suspended from the central frame, a laterally disposed internal right and left threaded sleeve rotatably mounted on the lower side of said casing but held against translation with respect thereto, means for manually rotating said sleeve, threaded pivot rods engaging in opposite ends of said sleeve, and intermediate mechanism connecting said rods and said tiltable feathers whereby longitudinal movement of said rods tilts the feathers.

5. A flying machine comprising a center-frame provided with a closed top and bottom, extension-planes at both sides of the center frame at the top and bottom thereof, a plurality of tiltable feathers in the upper and lower planes of the extension-frames, a motor-casing suspended to swing from the center-frame and actuating mechanism between the motor-casing and the pivots of the tiltable feathers for moving them automatically by the swinging of the motor-casing, the motor-casing being suspended from transverse trusses of the center supporting frame in such a manner that its motion can take place in lateral direction, but not in a direction at right angles thereto.

6. A flying machine comprising a center-frame provided with a closed top and bottom, extension-frames at both sides of the top and bottom planes of the center-frame, a plurality of tiltable feathers in the upper and lower planes of the extension-frames, a motor-casing suspended to swing from the center-frame, actuating mechanism between the motor-casing and the pivots of the tiltable feathers for setting them automatically by the lateral swinging of the motor-casing, the motor-casing being suspended from transverse trusses of the center supporting frame in such a manner that its motion can take place in lateral direction, but not in a direction at right angles thereto, and a propeller on the motor-shaft.

7. A flying machine comprising a center-

frame provided with a closed top and bottom, extension-frames at both sides of the center-frame in line with said top and bottom, a plurality of tiltable feathers in the upper and lower planes of the extension-frames, a motor-casing suspended to swing from the center-frame, actuating mechanism between the motor-casing and the pivots of the tiltable feathers for moving them automatically by the lateral swinging of the motor-casing, a propeller on the motor-shaft, horizontal and vertical steering planes, and means for operating the same from the center-frame.

8. A flying machine, comprising a center-frame closed at the top and bottom, extension-frames at both sides of the top and bottom-planes of the center-frame, a plurality of tiltable feathers in the upper planes of the extension-frames, a laterally swinging motor-casing suspended from the center-frame, actuating mechanism between the motor-casing and the tiltable feathers for oscillating the feathers in opposite direction, and means for simultaneously and manually adjusting the tiltable feathers in the same direction.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

OTTO HASELAU

Witnesses:
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HENRY J. SUHRBIER.