H. BEA.

FLYING MACHINE.

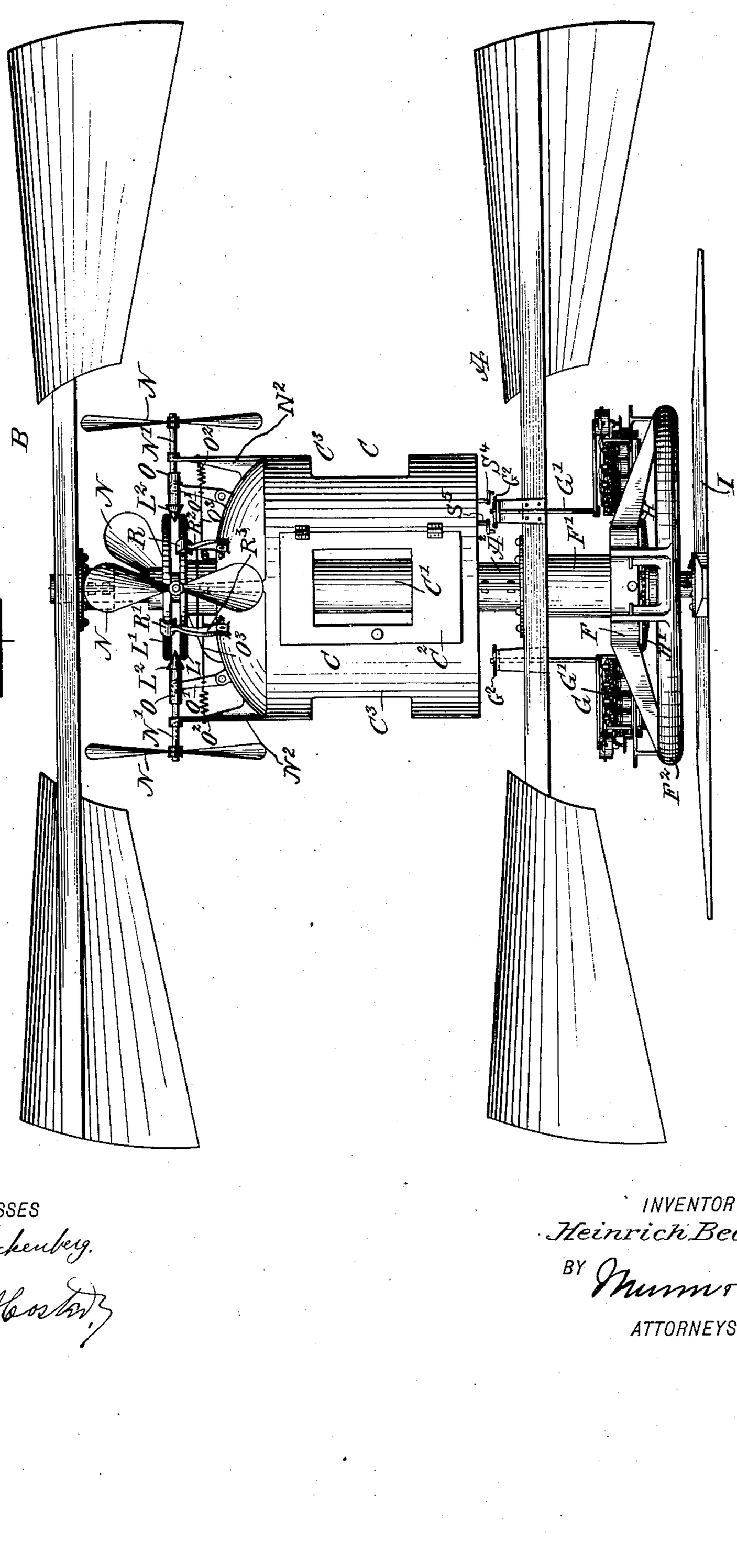
APPLICATION FILED JULY 3, 1908.

910,773.

Patented Jan. 26, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2.

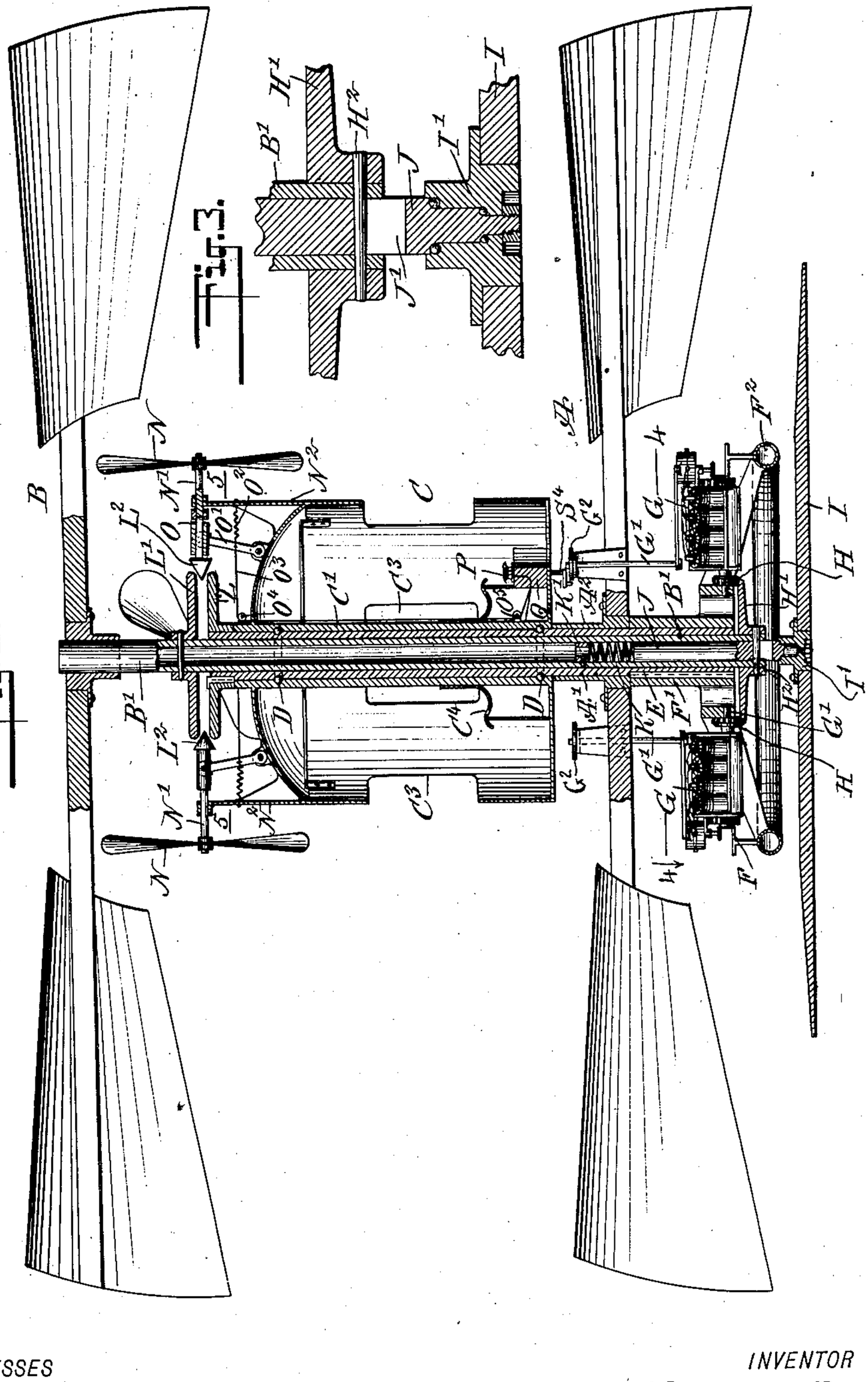

Fig. 3.

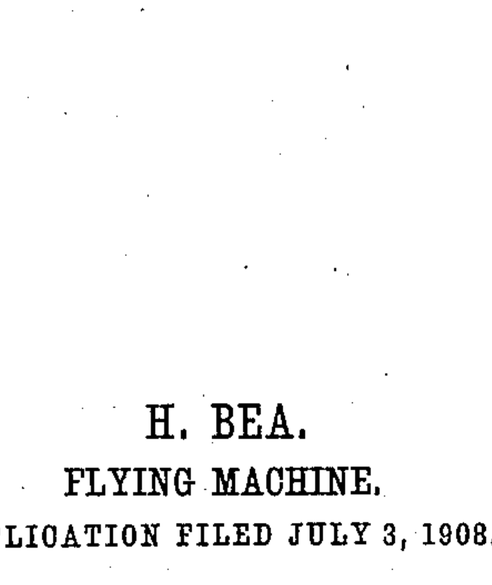

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Fig. 5.

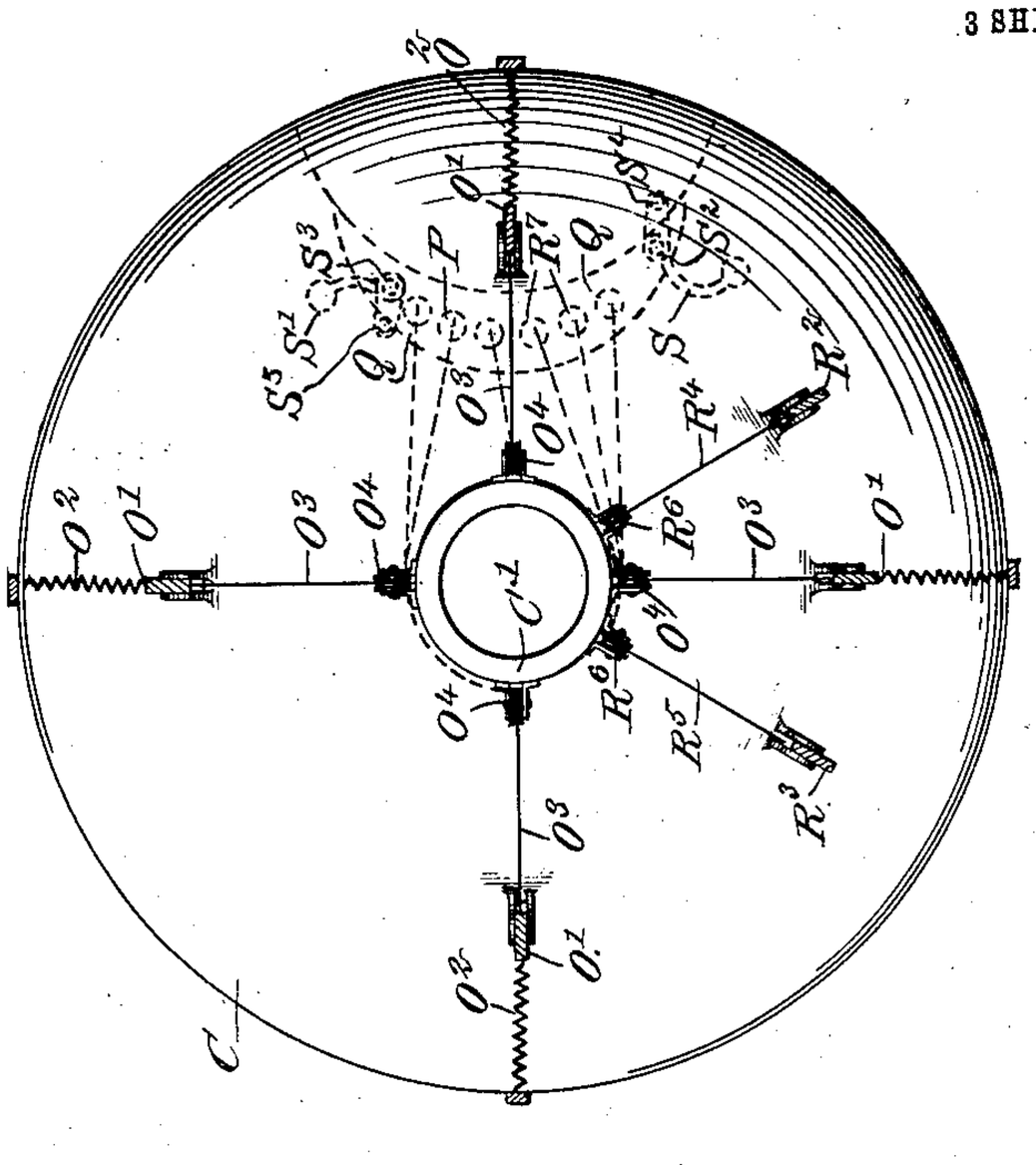
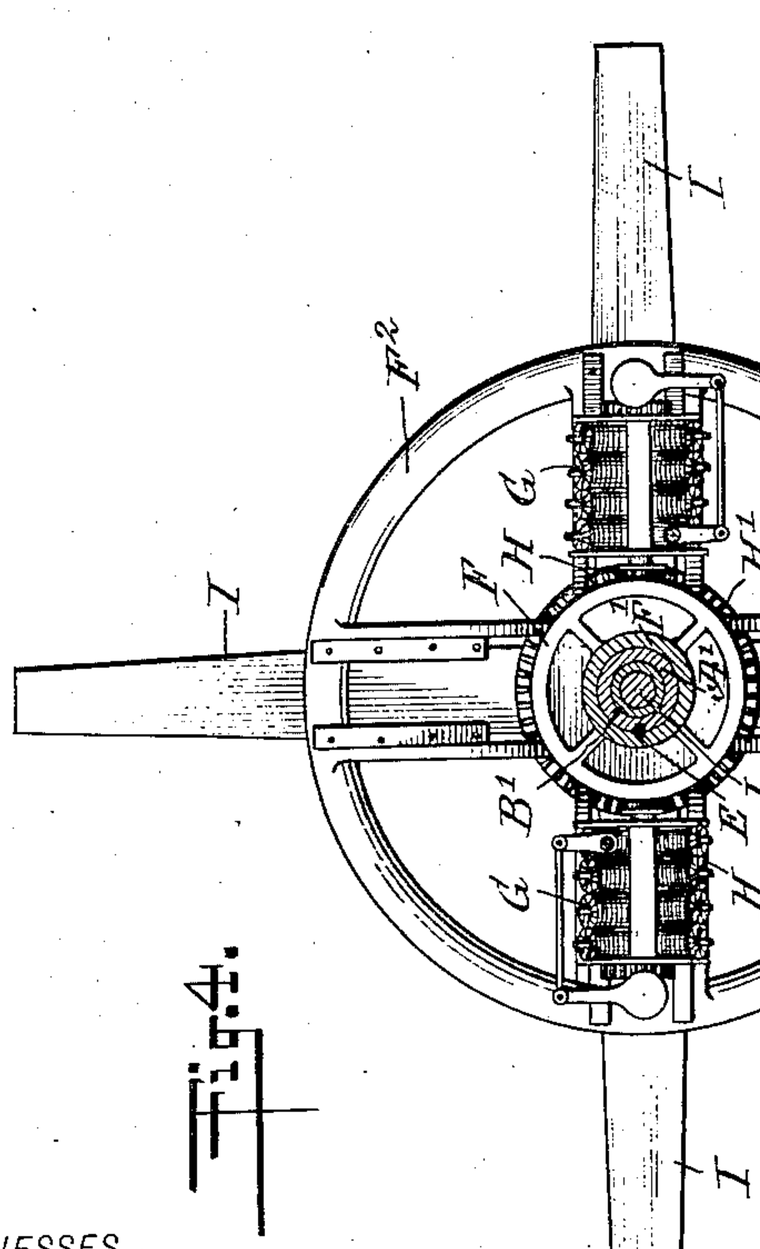


Fig. 6.

Fig. 4.



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UNITED STATES PATENT OFFICE.

HEINRICH BEA, OF JERSEY CITY, NEW JERSEY.

FLYING-MACHINE.

No. 910,773. Specification of Letters Patent. Patented Jan. 26, 1909.

Application filed July 3, 1908. Serial No. 441,906.

To all whom it may concern;

Be it known that I, HEINRICH BEA, a subject of the King of Würtemberg, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Flying-Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved aeronef or flying machine of the heavier-than-air type, and arranged to permit the operator to readily control the working parts for raising, lowering and propelling the machine in the desired direction, maintaining it in equilibrium and allowing easy landing without shock or jar.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement; Fig. 2 is a sectional side elevation of the same; Fig. 3 is an enlarged sectional side elevation of the yielding connection between the foot and one of the propeller shafts. Fig. 4 is a central plan view of the improvement on the line 4—4 of Fig. 2; Fig. 5 is an enlarged sectional plan view of the cage on the line 5—5 of Fig. 2; and Fig. 6 is a plan view of the segment for the motor controlling mechanism.

The propeller or power wheels A and B of the flying machine are disposed horizontally one above the other and are rotated in opposite directions, the wings of the wheels being arranged in opposite directions, and the cage C for containing the operator and passengers is located intermediate the propeller wheels A and B. The shafts A′ and B′ of the propeller wheels A and B are made hollow, and the shaft B′ extends through the shaft A′, and the latter extends through a centrally-arranged column C′ forming an integral part of the cage C as indicated in Fig. 2. Ball bearings D are arranged between the shaft A′ and the column C′, to allow the shaft A′ to rotate in the column C′ and to support the cage C on the shaft A′. The bottom of the column C′ preferably rests on the sectional hub A^2 of the wheel A, and the said hub A^2 is clamped or otherwise secured to the shaft A′ (see Fig. 1).

To the lower end of the shaft A′ is rigidly secured by the use of a key E or other fastening means, the hub F′ of a motor frame F, carrying engines, gasolene or other motors G of any approved construction, employed for rotating the wheels A and B in opposite directions, as hereinafter more fully explained. The motors G have their shafts G′ arranged radially relatively to the axes of the shafts A′, B′, and on the inner ends of the shafts G′ are secured pinions H, in mesh with a gear wheel H′, fastened by a pin H^2, to the lower end of the shaft B′ of the upper propeller wheel B.

The motor frame F is provided with a bottom ring F^2, preferably made tubular, and adapted to rest on a foot I, preferably in the form of a cross, as shown in Fig. 1, the foot I being adapted to rest on the ground when the machine is not in use, to support the latter in an upright position. The foot I is provided at its center with a bearing I′ for the lower end of a pin J to turn in, the said pin extending in the lower end of the hollow shaft B′ and having an elongated slot J′ through which passes the pin H^2, previously mentioned (see Figs. 2 and 3). The upper end of the pin J is pressed on by a coiled spring K held in the hollow shaft B′ and resting with its upper end on a block K′ secured to the shaft B′ at the inside thereof (see Fig. 2). Now when the machine is at rest the foot I rests on the ground and the bottom ring F^2 of the motor frame F rests on the top of the foot I, so that when the motors G are slowly started the motor frame F first remains at a standstill and with it the lower propeller wheel A, while the upper propeller wheel B is driven from the motors G by way of the pinions H, gear wheel H′, pin H^2 and shaft B′. When the wheel B is rotated, it exerts an upward pull on the shaft B′, which by the pin H^2 lifts the gear wheel H′, the pinions H and consequently the motors G and the frame F, so that the bottom ring F^2 moves out of engagement with the top of the foot I held in a lowermost position on the ground by the action of the spring K for the time being. Now as soon as the bottom ring F^2 leaves the foot I the motor frame F by the reaction of the pinions H on the gear wheels

H′ rotates in an opposite direction to the shaft B′, and consequently the motor frame F by its connection with the shaft A′ rotates the lower propeller wheel A in the direction reverse to that given to the upper propeller wheel B. The lifting power exerted by both wheels A and B rotating in opposite directions is sufficient to cause the machine to rise in the air, it being understood that the foot I is carried along owing to the pin J now resting on top of the pin H², as indicated in Figs. 2 and 3. When the machine descends, the non-rotating foot I first touches the ground and then the bottom ring F² gradually moves downward and engages the foot I, to finally bring the motor frame F and consequently the lower wheel A to a standstill while the motors G are still running, and then the propeller wheel B can be brought to a standstill on stopping the motors G. Thus from the foregoing it will be seen that an easy and gradual ascending as well as a corresponding alighting or landing is had without shock or jar to the machine or the occupants of the cage C.

The center of gravity of the machine lies in the axes of the propeller wheels A and B at a point below the cage C, and the steering of the flying machine is accomplished by tilting the machine from the center of gravity in the direction in which the machine is to travel, it being understood that when the machine is in the tilted position the propeller wheels A and B drive the machine in the desired direction owing to their incline to the horizontal. For the purpose mentioned the following arrangement is made: On the shafts A′, B′ directly above the cage C are secured the friction disks L and L′, spaced apart to permit of moving conical pinions L² in engagement with the opposite faces of the said friction disks L and L′, with a view to rotate the pinions L² from the said friction disks L and L′. The pinions L² are secured on shafts N′ of steering wheels N, preferably four in number, arranged equidistant apart and disposed vertically, so that when any one of the steering wheels N is caused to rotate it tends to tilt the machine in a forward direction, that is to say, if the steering wheel N at the right-hand side of the machine (see Figs. 1 and 2) is rotated, the machine is tilted from the right to the left to cause the machine to travel in this direction. The shafts N′ are journaled in suitable bearings N² attached to the top of the cage C, as plainly indicated in the drawings, and by arranging the steering wheels N at this point, it is evident that an easy tilting of the machine takes place whenever one of the steering wheels N is actuated, as above mentioned. Normally the pinions L² are out of mesh with the friction disks L and L′, and any one of the pinions can be moved into mesh at the will of the operator located in the cage C. For the purpose mentioned each shaft N′ is provided with a shifting sleeve O, engaged by a shifting lever O′ normally pressed on by a spring O² for holding the shifting sleeve O and the shaft N′, the pinion L² and steering wheel N in an outermost dormant position. Each lever O′ is connected with one end of a rope or cable O³ extending over guide pulleys O⁴, O⁵ to the inside of the cage C and to a block Q held in the cage C. The inner ends of the ropes or cables O³ are attached to handles P adapted to be taken hold of by the operator, to exert a pull on the corresponding rope or cable O³, with a view to swing the corresponding lever O′ inwardly and thus move the corresponding pinion L² in mesh with the rotating disks L and L′. Now when this takes place the corresponding steering wheel N is rotated, to tilt the machine in the desired direction.

In order to turn the cage on its axis with a view that the operator seated in the cage is always at the front of the machine, the following arrangement is made: The peripheral faces of the friction disks L and L′ are adapted to be engaged by brake shoes R, R′ held on the upper ends of brake levers R², R³ fulcrumed on the top of the cage C and connected with ropes or cables R⁴, R⁵ extending over guide pulleys R⁶ to the inside of the cage C and to the block Q, the inner ends of the ropes or cables R⁴, R⁵ being provided with knobs R⁷ under the control of the operator, to allow the latter to pull the ropes or cables R⁴, R⁵ and thereby swing the levers R², R³ inward, to cause the brake shoes R and R′ to engage the friction disks L and L′ with a view to turn the cage C either to the right or the left, according to the direction in which the machine is to be propelled.

The cage C is preferably made cylindrical, with a door C² and windows C³ in the sides, and with an annular seat C⁴ arranged around the column C′, to accommodate the operator and the passengers. In the cage C are also arranged the controlling mechanisms for controlling the speed of the motors G, so that the operator in charge of the machine and located in the cage C can control the speed of the propeller wheels A and B, and by manipulating the knobs P, the operator can control the tilting of the machine to cause the latter to travel in the desired direction, the operator being always in front of the cage as the latter is turned to the right or left by the operator manipulating the knobs R⁷.

The motor controlling mechanisms consist of handles S, S′ attached to vertically disposed shafts S², S³, journaled in the block Q and extending below the bottom of the cage C, the lower ends of the shafts S², S³ carrying crank arms S⁴, S⁵, adapted to engage segments G² forming part of the mechanisms for controlling the ignition of the motors G, so that when the operator throws,

say, the handle S into active position then the corresponding crank arm S^4 turns the segments G^2 more or less in one direction to actuate the igniting devices of the corresponding motors G with a view to slow up the motors. In a like manner the motor can be caused to run faster by the operator moving the other handle S′ into operating position to turn the segments G^2 in the opposite direction.

It is understood that while the machine is in flight the propeller wheels turn constantly, but their speed can be changed.

The exhaust of the motors G is preferably directed into the ring F^2 which is preferably made hollow and serves as a muffler.

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

1. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame, and a gearing connecting the motor shafts with the other propeller wheel.

2. A flying machine, comprising a motor frame, motors mounted thereon and having their shafts disposed radially, pinions on the motor shafts, a gear wheel in mesh with the said pinions, upper and lower propeller wheels, the shaft of the upper propeller wheel engaging the said gear wheel, and the shaft of the lower propeller wheel being connected with the said motor frame, and a cage mounted loosely on the lower propeller wheel shaft and arranged intermediate the propeller wheels.

3. A flying machine, comprising a motor frame, motors mounted thereon, a cage, and propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, the shafts of the propeller wheels extending centrally through the said cage and a yielding foot for engaging the motor frame to brake the same when the machine is at rest.

4. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, the shafts of the propeller wheels extending centrally through the said cage, spaced friction disks on the said shafts, steering wheels mounted on the cage and friction pinions on the shafts of the said steering wheels and arranged for contact with the said friction disks.

5. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, the shafts of the propeller wheels extending centrally through the said cage, spaced friction disks on the said shafts, steering wheels mounted on the cage, friction pinions on the shafts of the said steering wheels and arranged for contact with the said friction disks, and manually controlled means for moving the said pinions in and out of mesh with the said friction disks.

6. A flying machine, comprising a cage, rotary propeller wheels mounted to rotate in opposite directions above and below the said cage, the said propeller wheels being disposed horizontally, having their axes coinciding with the vertical axis of the cage, steering wheels mounted on the said cage and disposed vertically, and means for rotating the steering wheels from the said propeller wheels, and manually controlled actuating means for throwing either of the said steering wheels into action.

7. A flying machine provided with a cage, propeller wheels having their vertical shafts extending centrally through the said cage, a motor frame fixed on one of the said shafts, motors on the said frame for driving the other propeller wheel shaft, and a foot having a yielding connection with the said driven propeller shaft and on which is adapted to rest the said motor frame.

8. A flying machine provided with a cage, propeller wheels having their vertical shafts extending centrally through the said cage, a motor frame fixed on one of the said shafts, motors on the said frame for driving the other propeller wheel shaft, a foot having a yielding connection with the said driven propeller shaft and on which is adapted to rest the said motor frame, and manually controlled means in the said cage for controlling the speed of the said motors.

9. A flying machine provided with a cage, propeller wheels having their vertical shafts extending centrally through the said cage, a motor frame fixed on one of the said shafts, motors on the said frame for driving the other propeller wheel shaft, a foot having a yielding connection with the said driven propeller shaft and on which is adapted to rest the said motor frame, steering wheels grouped around the said cage, and manually-controlled means for throwing either one of the steering wheels in gear with the propeller wheels.

10. A flying machine provided with parallel propeller wheels rotating in opposite directions, a motor frame connected with one of the propeller wheels, motors on the said motor frame and geared with the other

propeller wheel, and a yieldingly mounted foot on the driven propeller wheel adapted to form a rest for the said motor frame.

11. A flying machine provided with a base, a motor frame adapted to rest on the base and to rotate bodily, alined propeller wheels having shafts of which one is attached to the motor frame and the other has a yielding connection with the said base, motors on the said frame, and a gearing connecting the motors with the said propeller wheel shaft yieldingly connected with the base.

12. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, the shafts of the propeller wheels extending centrally through the said cage, and means for turning the cage to the right or left.

13. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, the shafts of the propeller wheels extending centrally through the said cage, brake wheels on the said shafts, and manually-controlled brakes mounted on the cage and controlled by the operator for moving the brakes into and out of contact with the said brake wheels, to turn the cage to the right or left.

14. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, and means for turning the said cage to the right or left.

15. A flying machine, comprising a motor frame, motors mounted thereon, a cage, propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the said motor frame and the other propeller wheel being driven from the said motors, the shafts of the propeller wheels extending centrally through the said cage, spaced friction disks on the said shafts, and manually-controlled brakes on the cage and adapted to engage the said friction disks.

16. A flying machine provided with a base, a motor frame adapted to rest on the base and to rotate bodily, alined propeller wheels having shafts of which one is attached to the motor frame and the other has a yielding connection with the said base, motors on the said frame, and a gearing connecting the motors with the said propeller wheel shaft.

17. A flying machine, comprising a cage and rotary propeller wheels mounted to rotate in opposite directions above and below the cage, and means upon which the machine rests when not in flight for engaging the lower wheel to brake the same.

18. A flying machine comprising horizontal propeller wheels having their wings inclined in opposite directions, means for rotating the said wheels in opposite directions, and means yieldingly mounted with respect to one of said wheels, and upon which the machine rests when not in flight, for engaging and braking said wheel.

19. A flying machine comprising a motor frame, motors mounted thereon, a cage and propeller wheels, one above the cage and the other below the cage, one of the propeller wheels being connected and turning with the motor frame, and the other being driven from the motors, and yielding means upon which the machine rests when not in flight for engaging the motor frame to brake the same.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH BEA.

Witnesses:
J. FRANK WIND, Jr.,
CECILIA JONES.