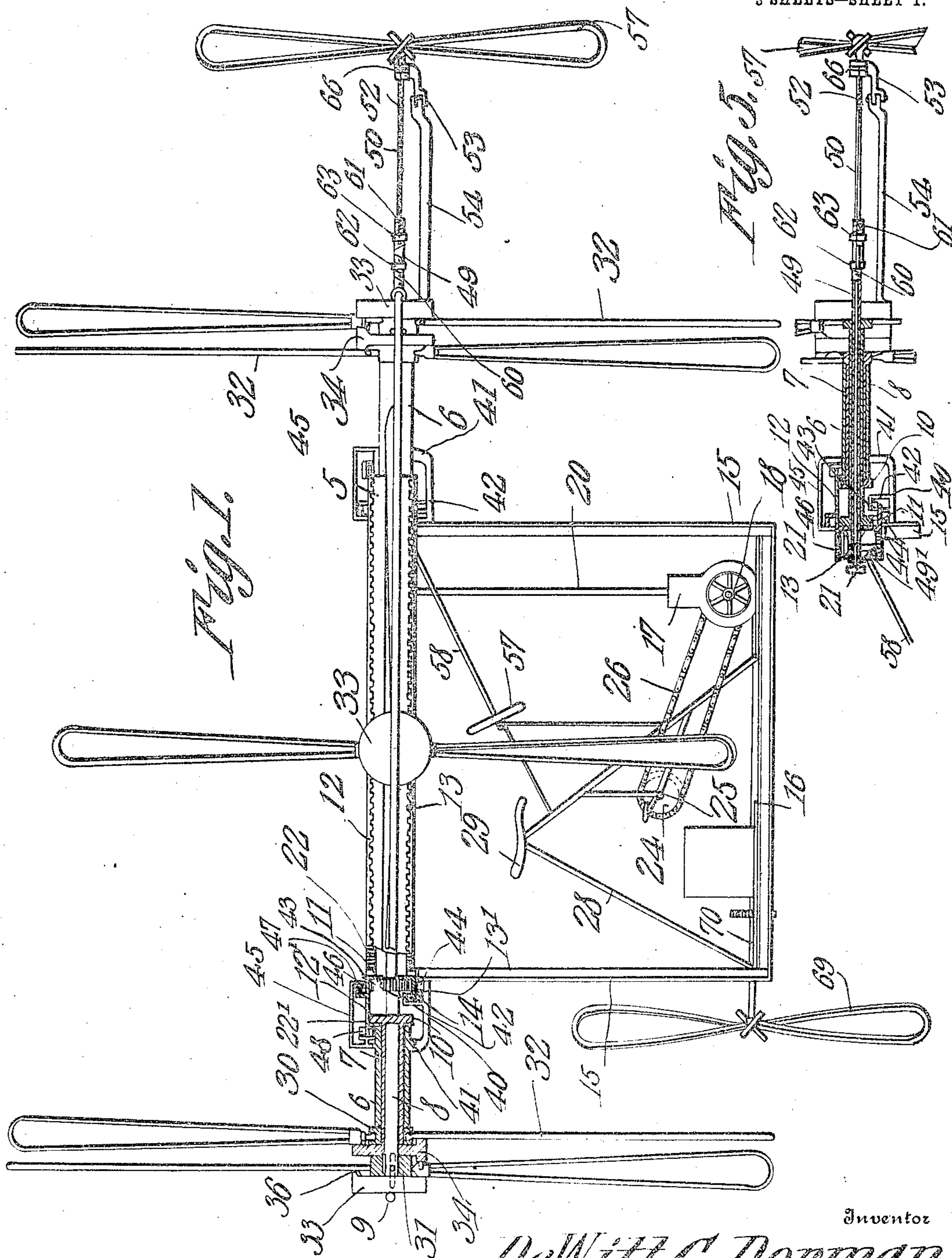


DE WITT C. DORMAN.  
FLYING MACHINE.  
APPLICATION FILED DEC. 21, 1908.

984,717.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 1.



Witnesses

*E. H. Smith*  
H. G. Smith.

Inventor

*Dr. Witt C. Dorman.*

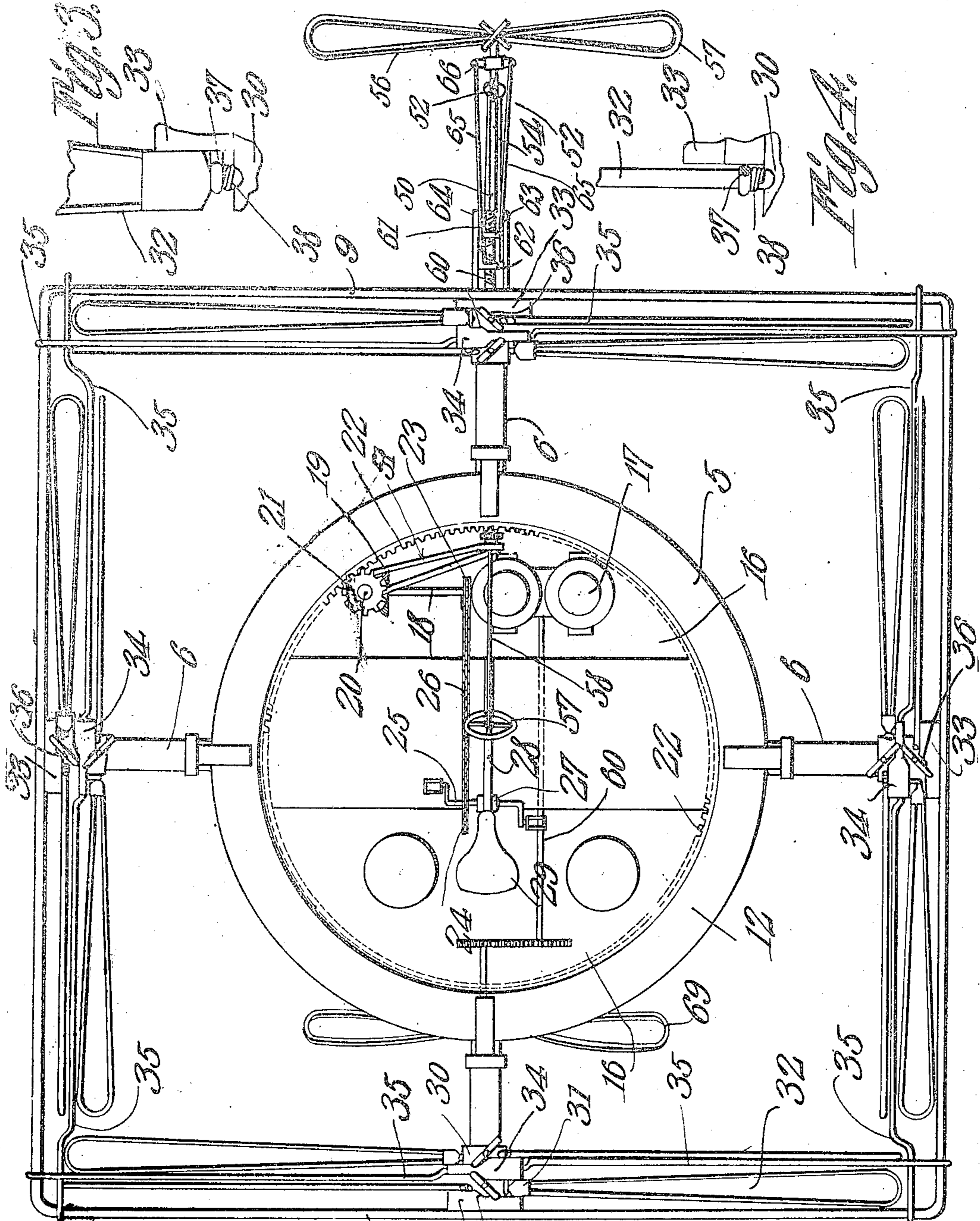
*Chas. H. Co.*  
Attorneys

DE WITT C. DORMAN.  
FLYING MACHINE.  
APPLICATION FILED DEC. 21, 1908.

934,717.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 2.

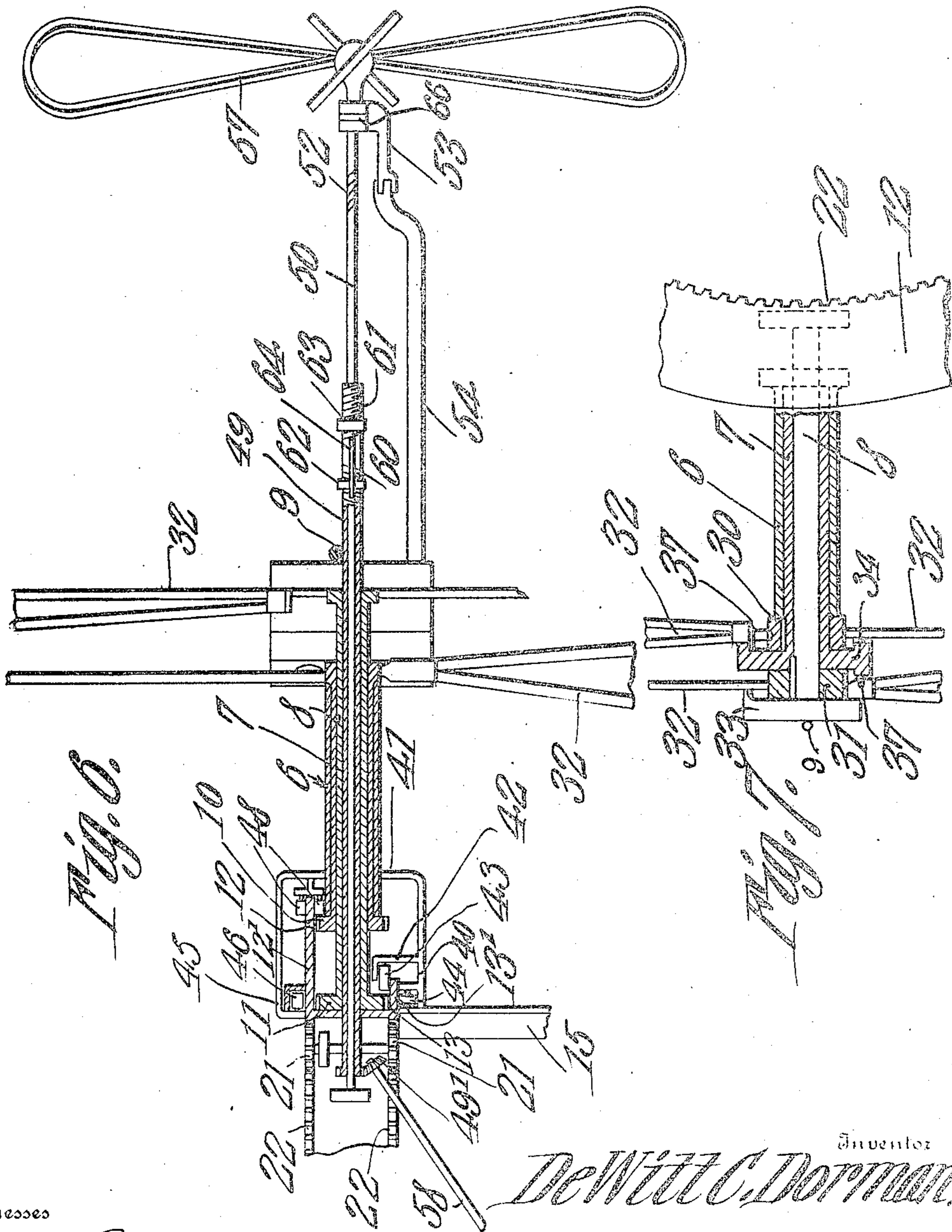


Witnesses  
E. H. Hunt  
H. G. Smith  
Inventor  
DeWitt C. Dorman.  
By C. A. Snow & Co.  
Attorneys

DE WITT C. DORMAN.  
FLYING MACHINE.  
APPLICATION FILED DEC. 21, 1908.

934,717.

Patented Sept. 21, 1909.  
3 SHEETS—SHEET 3.



Witnesses

*E. J. Stewart*  
*F. G. Smith*

Inventor

*De Witt C. Dorman*

By

*Chas. H. Co.*  
Attorneys

# UNITED STATES PATENT OFFICE.

DE WITT C. DORMAN, OF MINOT, NORTH DAKOTA.

## FLYING-MACHINE.

934,717.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed December 21, 1908. Serial No. 468,598

*To all whom it may concern:*

Be it known that I, DE WITT C. DORMAN, a citizen of the United States, residing at Minot, in the county of Ward and State of North Dakota, have invented a new and useful Flying-Machine, of which the following is a specification.

This invention relates to flying machines of the heavier-than-air type, and has for its principal object to provide a machine having a novel arrangement of lifting fans arranged to revolve on horizontal axes and so mounted as to be capable of feathering, so that on the downward stroke the flat faces of the fan blades will operate to force the machine upward while on the upward portion of the stroke the blades will be presented edgewise for travel through the air.

A further object of the invention is to arrange the fans in pairs, the fans of each pair being arranged to rotate in opposite directions, respectively, so that the lifting force will be equalized and any tendency to lateral movement will be corrected.

A still further object of the invention is to provide a novel form of steering mechanism in which a combined steering and propelling wheel or fan is arranged at one end of the machine and is mounted in a pivoted support so connected to a steering wheel as to permit movement in either direction for the purpose of directing the course of travel of the machine.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a side elevation of a flying machine constructed in accordance with the invention, a portion of the mechanism being shown in section. Fig. 2 is a plan view of the machine. Figs. 3 and 4 are detail views of the mounting of the lifting fan blades. Fig. 5 is a longitudinal section illustrating the construction and mounting of the steering device. Fig. 6 is a view showing the driving mechanism for one of the groups of lift-

ing propellers, and Fig. 7 is a view illustrating the mechanism shown in Fig. 5 but on a larger scale.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

As shown in the accompanying drawings, a flying machine embodying the invention comprises in part a suitable frame, from the upper portion of which extend radially disposed bearing sleeves 6, there being preferably four of such bearings extending from the frame at equidistant points. Journaled in each of these bearing sleeves is a tubular shaft 7, and extending through each of the tubular shafts is a shaft 8. The outer end of each shaft 8 is supported in a bearing of the construction more specifically described hereinafter, and which is located at a point about mid-way of the end of one side of a rectangular frame 9 that is clearly shown in Fig. 2 of the drawing. A gear wheel 10 is fixed on the inner end of each tubular shaft 7 and a gear wheel 11 is fixed on the inner end of each shaft 8. These gears intermesh, respectively, with annular racks 12 and 13, the former being carried by a wheel 12' that is arranged in a plane above the shafts 7 and 8, while the rack 13 is carried by a ring 13' that is disposed in a plane below the gears 11. It will be understood that upon rotation of the rings, the shafts 7 and 8 will be rotated in opposite directions.

Supported by suitable hangers 15 from the upper frame is a platform 16, upon which is mounted a motor 17 which may be in the form of an internal combustion engine. The main shaft 18 of the motor carries a bevel gear 19 intermeshing with a gear at the lower end of a vertical counter-shaft 20. At the upper end of the shaft 20 is a pair of pinions 21 which are in mesh with annular racks 22 formed on the inner edges of the rings 12' and 13', it being understood that power from the engine is transmitted by way of the shaft 20 to the rings and from thence through the racks 12 and 13 to the gears of the shafts 7 and 8.

In order to permit ready starting of the motor, and to permit operation of the fans in case of stoppage of the motor, the shaft 18 carries a sprocket wheel 23 that is connected to a sprocket wheel 24 on the crank shaft 25 by means of a link belt 26. The crank shaft 25 is journaled in a suitable bearing 27 arranged at the lower portion of a frame 28 which carries a suitable seat or

saddle 29. In order that the pedal crank shaft 29 may remain stationary while the engine is in operation, a suitable clutch mechanism similar to that employed in ordinary  
 5 coaster brakes may be employed in the connection between the main shaft of the engine and the pedal crank shaft, but this mechanism being of well known and ordinary construction has not been illustrated in the  
 10 drawings.

Secured from the shafts 7 and 8, respectively, are fan hubs 30 and 31, and to these are pivoted the inner ends of the stems of fan blades 32, said blades being formed of  
 15 any suitable material. It is intended that the blades carried by the two hubs shall rotate in opposition and that when a flat face of one blade of one of the hubs is presented toward the surface of the ground, the blade  
 20 upon the other hub passing the first mentioned blade will be feathered or turned edgewise, this being clearly illustrated in Fig. 1 of the drawing. In order that the blades may be properly feathered as above described, a pair of cams 33 and 34 are employed in connection with each pair of fans.  
 25 The inner cam 34 is provided with two cam faces 36, while the outer cam 33 has a single cam face 36. This outer cam member 33 is rigidly secured to the rectangular frame 9,  
 30 while the inner cam member 34 is supported by brace rods 35 which are secured at one end to the frame 9 and at the opposite end to the cam, these rods being so bent as to pass  
 35 between the two fans without danger of contact with the fan blades.

Secured to the inner end or stem portion of each of the fan blades, is an arm 37 that is held in contact with the cam face 36 by  
 40 means of a torsion spring 38. As the fans rotate, the arms 37 travel in contact with the stationary cams, and as the arms approach the larger portions of said cams, the blades will be turned, so as to present their edges to  
 45 the surface of the ground, the blades being held in this position during approximately half a revolution, or that portion of the revolution on the up-stroke or ascending side of the fan, but after passing beyond the vertical  
 50 plane of the shaft axis, the blades will be turned so as to present their flat faces to the surface of the ground, and during this down stroke, or on the descending side of the fan, the blades become effective for lifting purposes,  
 55 and as the blades are evenly distributed around the entire frame and are of exactly the same area, and travel at uniform speed, the lifting force will be equal at all points, and the machine will rise in a vertical  
 60 line.

Secured to or formed integral with each of the hangers 15 is a bracket extension 40 constituting a portion of the frame hereinbefore referred to. Each bracket has a body  
 65 portion 41 which may be integral with or

secured to the adjacent tubular bearing 6, and each of the brackets is formed adjacent its point of connection with the hanger with an upstanding portion 42 at the upper end of which is journaled a roller 43, that over-  
 70 lies the horizontal flange of the ring 13', there being also a roller 44 journaled upon the bracket 40, and in a plane below said flange, so that the latter will be held from displacement, but may freely rotate. Each  
 75 bracket 40 also includes a portion 45 which extends from the body portion 41 inwardly, above the ring 12' and has journaled at its inner extremity a roller 46, which travels between the body portion of said ring, and  
 80 an overhanging frame 47 formed thereon.

A pair of rollers 48 are journaled on the portions 45 of this bracket and these rollers receive between them the outer ends of the ring 12', so that the latter will be held from  
 85 displacement, but may rotate freely for the purpose of transmitting movement to the tubular shafts 7.

In order to provide means for steering the machine, one of the shafts 8, preferably  
 90 that one at the front of the machine, is tubular in form, as shown in Fig. 5. Extending through this tubular shaft is a hollow shaft 49, the inner end of which is connected by bevel gears 49' and shafts 58 to a hand wheel  
 95 57 that is disposed immediately in front of the seat or saddle and which may be turned for the purpose of directing the course of the machine, as hereinafter described.

Extending through the hollow shaft 49 is  
 100 a shaft 50, the inner end of which is connected in any suitable manner to the counter-shaft 20, the two shafts being shown in the present instance as provided with belt pulleys connected by a suitable driving belt 51.  
 105 The shaft 50 is formed of two sections connected by a flexible portion 52 and the outer section is supported in a small frame 53 that is pivoted to the outer end of a bracket 54 carried by a fixed portion of the frame, the  
 110 pivotal connection between the shaft supporting frame and bracket being in the vertical plane of the flexible section 52 of the shaft. The outer section of the shaft carries a combined propelling and steering fan 57  
 115 which is driven in the manner described from the shaft 20, and by turning the supporting frame 53 to one side or the other, the fan may be utilized in directing the course of the vessel to the right or left as desired.  
 120

The outer portion of the tubular shaft 49 is provided with right and left hand screw threads as indicated at 60, 61, and these engage the openings formed in a pair of slidable  
 125 blocks 62, 63 mounted in suitable guiders 64 on the fixed frame. The blocks are connected by rods 65 to arms 66 that project from the opposite sides of the frame 53. It will be seen that by turning the shaft 49 in  
 130 one direction or the other, the two blocks 62

and 63 may be turned toward or from each other, and this movement will be imparted through the rod 65 to the frame 53, thereby turning the latter either to the right or left  
5 and by thus changing the angle of the fan, the course of the machine will be controlled.

In addition to the fans 57, an auxiliary propelling fan 69 may be employed at the rear end of the machine, said fan being  
10 mounted on a suitable shaft 70 geared or otherwise connected to the motor, as shown.

What is claimed is:—

1. In a flying machine, a frame, horizontally disposed shafts radiating from the  
15 frame, fan blades carried by the shafts, means for feathering the blades, gears carried by the shafts, and annular racks intermeshing with all of the gears.

2. In a flying machine, a frame, radially  
20 disposed shafts carried by the frame, fan blades mounted on the shafts, gears carried by the shafts, a platform supported by the frame, a pair of spaced rings arranged above and below the gears, annular racks carried  
25 by said rings and intermeshing with the gears, and means upon the platform for rotating such rings.

3. In a flying machine, a frame, horizontally disposed radial shafts supported there-  
30 by, gears at the inner ends of the shafts, a pair of rings arranged above and below said gears, annular racks carried by the rings and intermeshing with the gears to effect ro-  
35 tative movement of the shafts in different directions, a platform supported by the frame, a motor on said platform, and a gearing connection between said motor and the rings.

4. In a machine of the class described, an  
40 outer rectangular frame, an inner frame including a plurality of spaced brackets, tubular bearing sleeves supported by the brackets, cams supported by the outer rectangular frame, auxiliary brace rods extending from  
45 the rectangular frame to the innermost of

the cams, a hollow shaft extending through each of the bearings, a fan hub on said hollow shaft, feathering blades carried by the hub and arranged to engage one of the cams, an inner shaft extending through the hollow  
50 shaft, a hub carried by the inner shaft, feathering blades carried by the inner hub and arranged to engage the outermost cam, gears on both shafts, a pair of upper and lower rings supported by the brackets, anti-  
55 friction rollers carried by the brackets and with which the rings engage, annular racks carried by the rings and intermeshing with the gears, and means for rotating said rings.

5. In a flying machine, having lifting  
60 fans, horizontally disposed concentric shafts supporting said lifting fans, a steering shaft extending through the innermost of the fan shafts, a driving shaft extending through  
65 the steering shaft, and made in sections connected by a flexible portion, a pivot support for the outermost section of the driving shaft, a propelling and steering frame carried by the outer section of the shaft, and  
70 means operable from the steering shaft for moving the support on the outer shaft section, and thus altering the angular position of the fan.

6. In a flying machine, a propeller, a propeller shaft having a flexible section, a pivot  
75 bracket carrying the outer portion of the shaft, a hollow steering shaft surrounding the propeller shaft, the steering shaft being provided with right and left hand threads, slide blocks having threaded openings to re-  
80 ceive said threads, and connections between the slide blocks and the bracket.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

DE WITT C. DORMAN.

Witnesses:

ROBERT H. BROAD,  
E. E. HANYEN.