D. SMITH.

FLYING MACHINE.

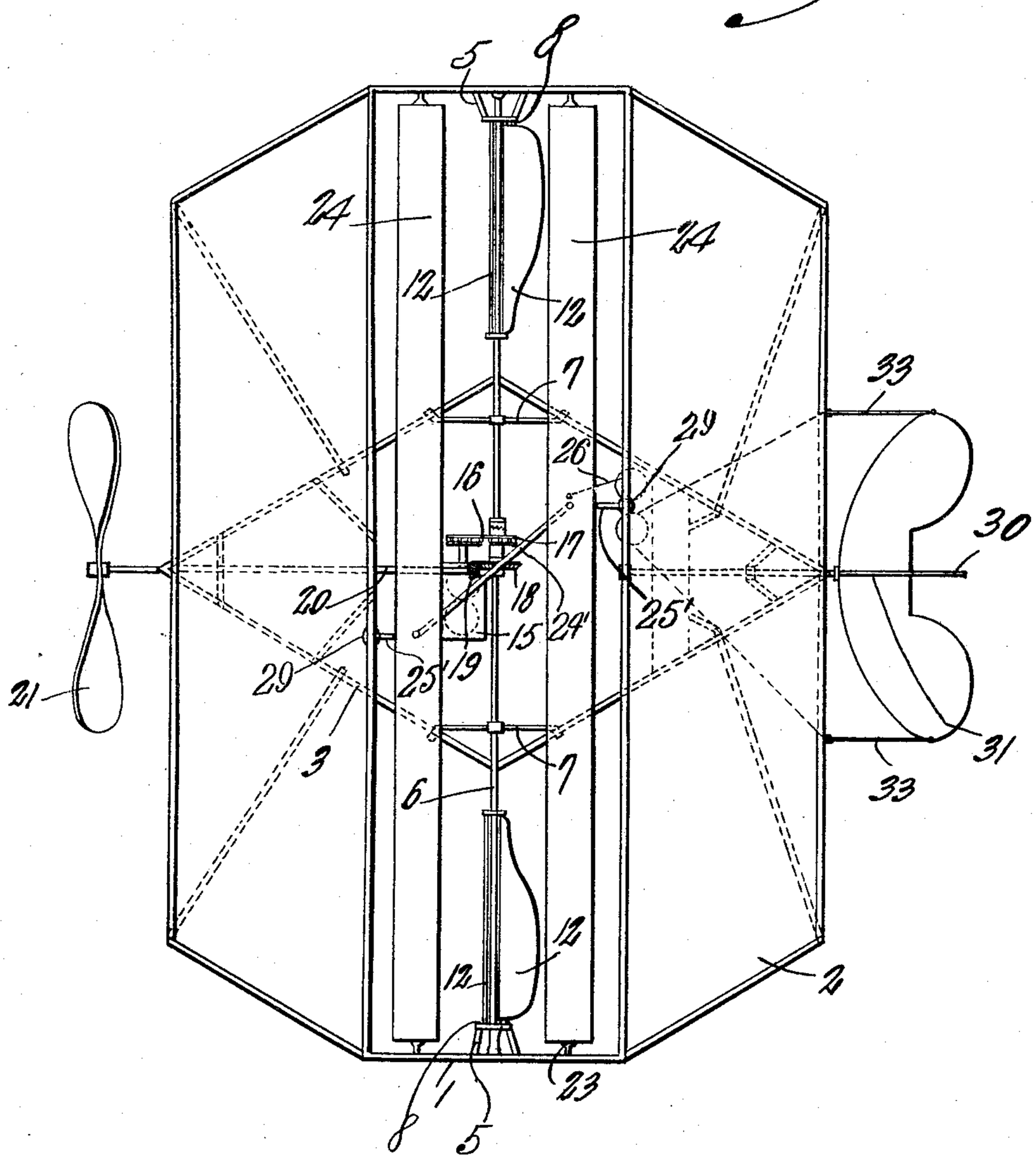
APPLICATION FILED APR. 11. 1913.

1,114,401.

Patented Oct. 20, 1914.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

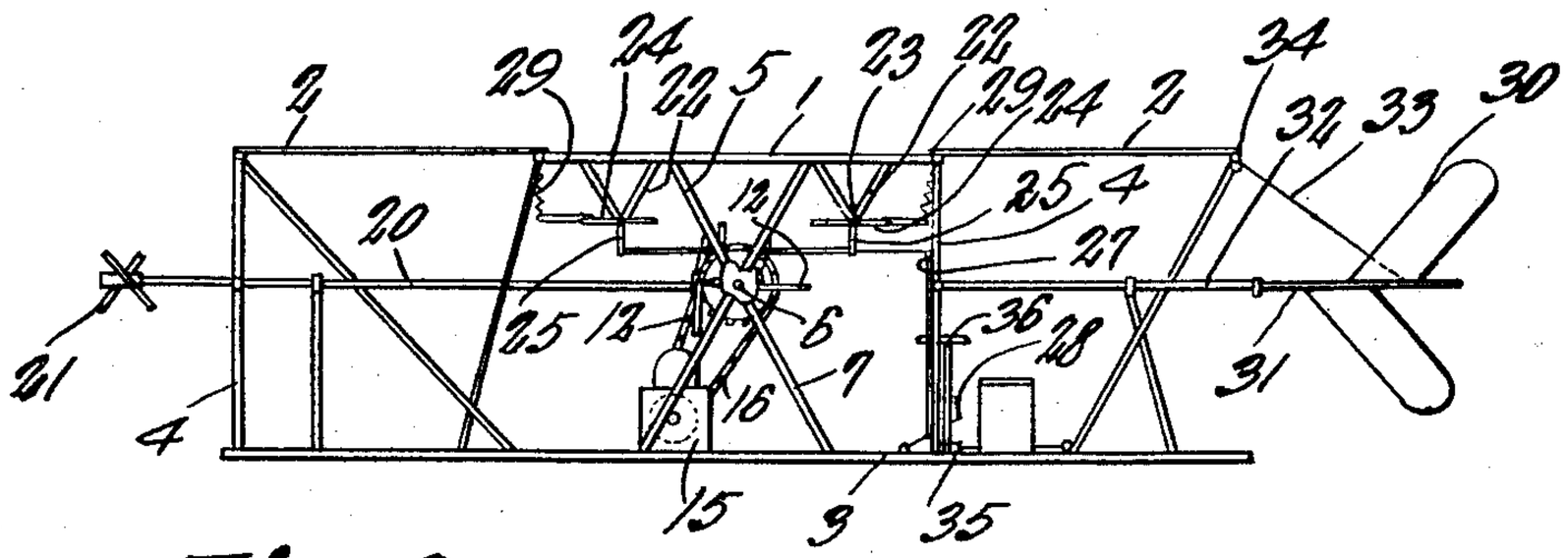

Fig. 2.

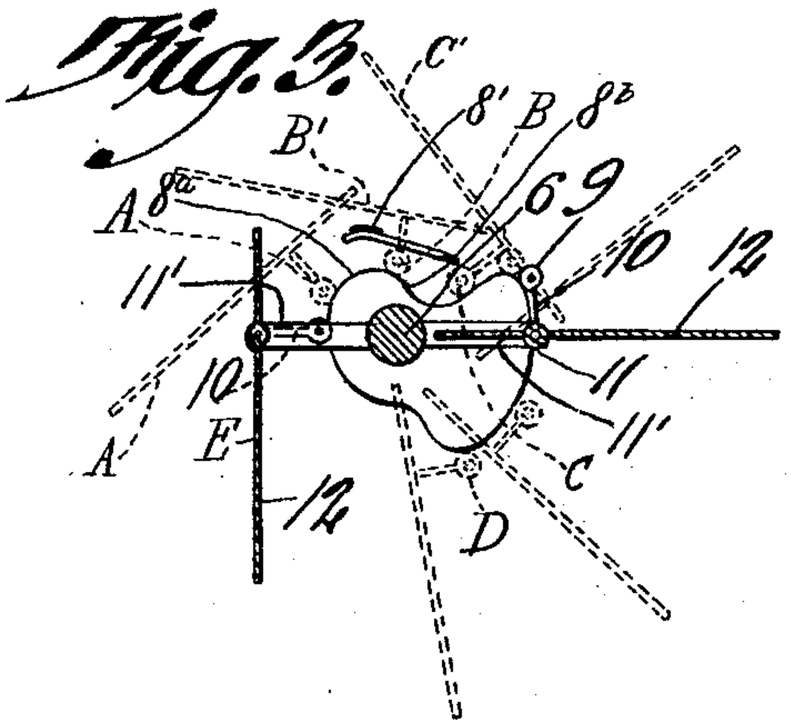

Fig. 3.

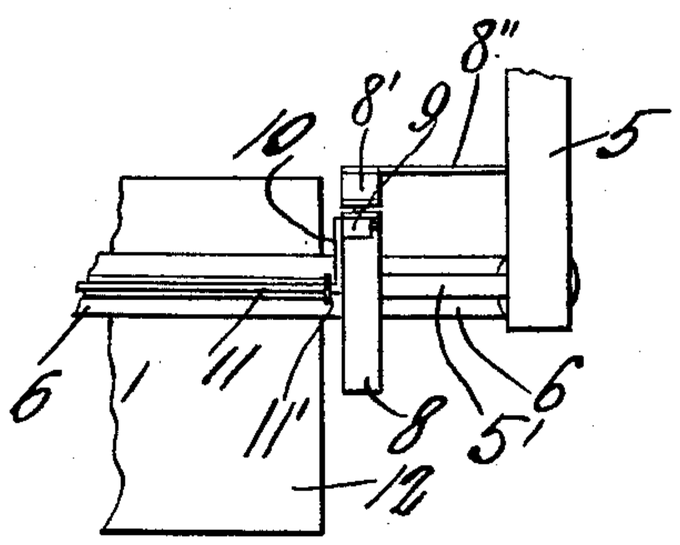

Fig. 4.

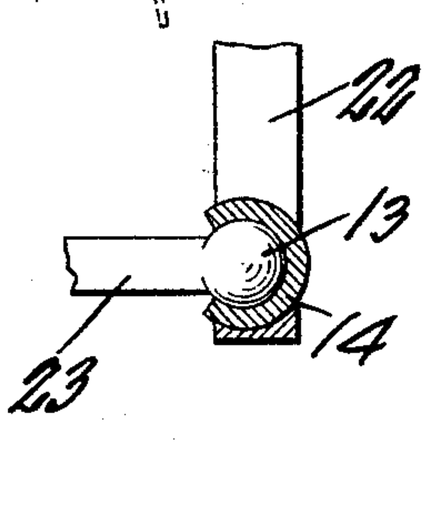

Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 6.

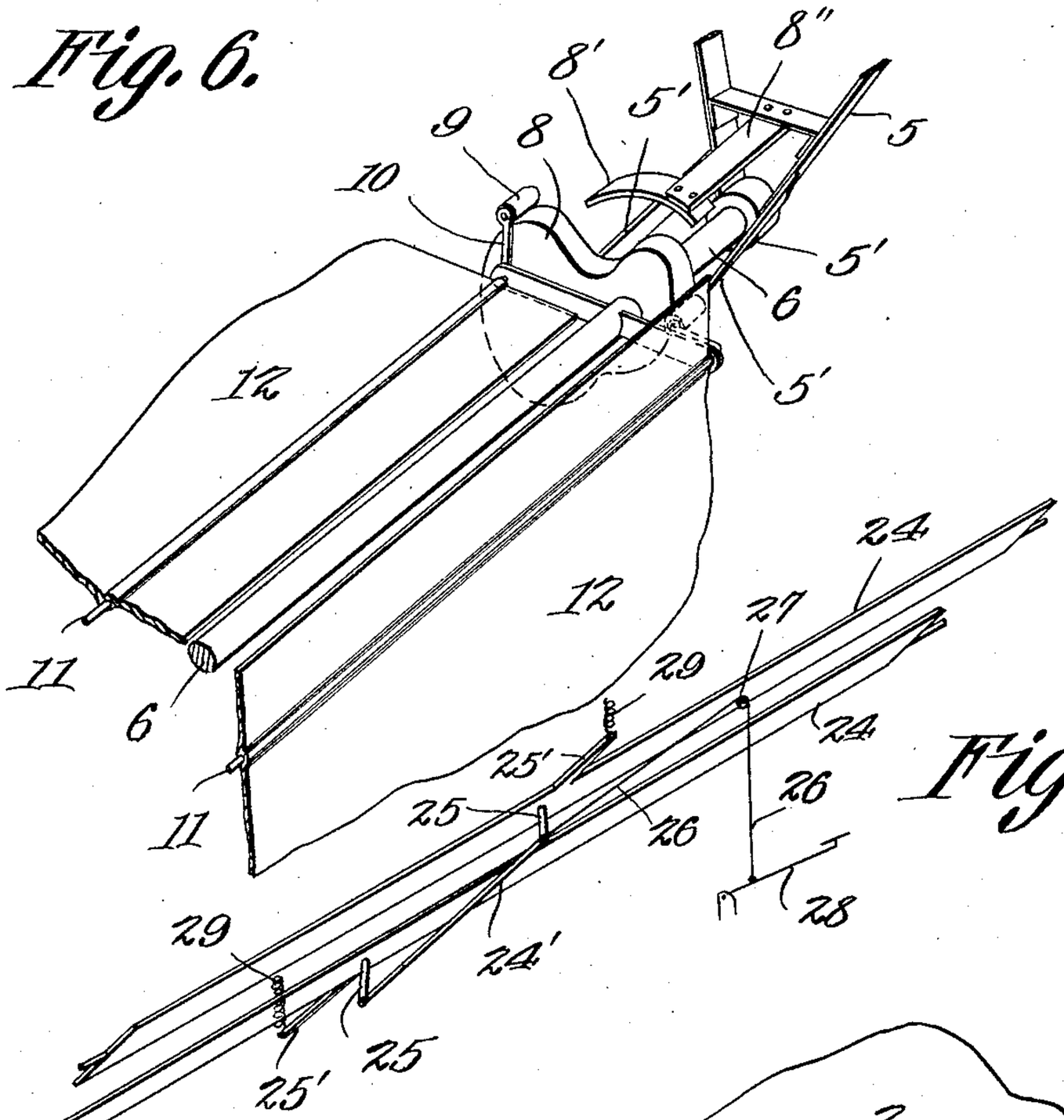

Fig. 7.

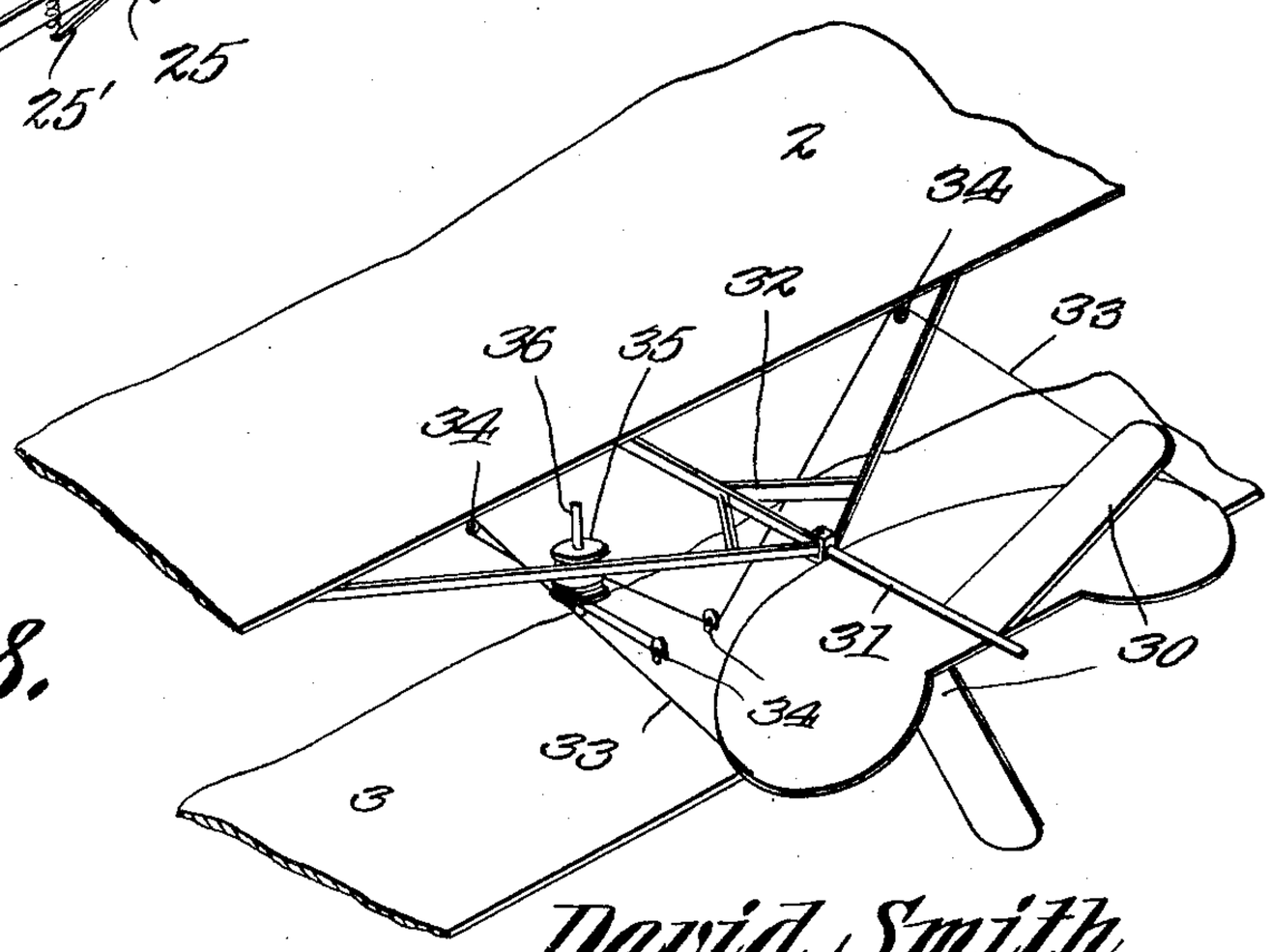

Fig. 8.

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UNITED STATES PATENT OFFICE.

DAVID SMITH, OF DOUGLAS, WYOMING.

FLYING-MACHINE.

1,114,401. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed April 11, 1913. Serial No. 760,512.

To all whom it may concern:

Be it known that I, DAVID SMITH, a citizen of the United States, residing at Douglas, in the county of Converse and State of Wyoming, 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, one of its objects being to provide a machine of this character having, in addition to sustaining planes, angularly adjustable controlling planes for regulating the up and down movement of the machine while in flight.

A further object is to provide elevating wheels for displacing air downwardly so as thus to assist the sustaining planes in maintaining the machine in flight and preventing the machine from dropping should either or both of the sustaining planes become injured from any cause.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a plan view of the machine. Fig. 2 is a side elevation. Fig. 3 is a side elevation of one of the controlling cams used in connection with the elevating wheels, the blades being shown in section in two positions and other positions of the blades being indicated by dotted lines. Fig. 4 is a front elevation of the parts shown in Fig. 3. Fig. 5 is a view partly in section and partly in elevation of the end portion of the shaft of the elevating wheels. Fig. 6 is a perspective view of the parts shown in Fig. 4. Fig. 7 is a perspective view of the controlling planes. Fig. 8 is a perspective view of the rudder and its operating mechanism.

Referring to the figures by characters of reference 1 designates the main or top frame of the machine, the same being provided with forwardly and rearwardly projecting extensions 2 constituting sustaining planes. The space within the frame 1 is open and arranged below the frame 1 and the planes 2 is a diamond-shaped lower frame 3 connected to the upper frame in any preferred manner, as by means of standards 4. This lower diamond-shaped frame supports most of the mechanism used in the propulsion of the machine.

Brackets 5 extend downwardly from the sides of the frame 1 and journaled therein is a shaft 6 extending transversely of the line of flight. This shaft can also be journaled in additional brackets 7 extending upwardly from the sides of the lower frame 3. Secured to each bracket 5 as by means of arms 5′ is a fixed cam 8. This cam is provided, in front of the shaft 6, with an eccentric portion 8^a merging into a top depression 8^b, and located back of this depression is a concentric portion 8^c extending through about 90° and then merging into the lower part of eccentric portion 8^a. Cam 8 is engaged by rollers 9 located at the free ends of crank arms 10, each crank arm being formed on or secured to one end of a shaft 11. Two of these shafts are preferably provided the same being parallel with shaft 6 and being journaled in oppositely extending radial arms 11′ which rotate with the shaft 6. Each shaft 11 has a blade 12 fixedly connected thereto. During the rotation of shaft 6 and, consequently, of the blades 12 about the axis of shaft 6, the roller 9 on each crank arm 10 will travel successively along the eccentric portion 8^a, the depression 8^b and the concentric portion 8^c of the adjacent cam. Consequently during the upward movement of each shaft 11 its roller 9 will drag along the eccentric portion 8^a, as shown by dotted lines at A in Fig. 3, thus to tilt the blades 12 as shown at A′. The roller 9 gradually moves off the eccentric portion 8^a and into the depression 8^b. A deflecting plate 8′ extends downwardly and rearwardly over the downwardly and rearwardly inclined wall of the depression 8^b and is held fixedly in any desired manner as by means of an arm 8″ connected to bracket 5. Thus it will be seen that as roller 9 passes off the eccentric portion 8^a toward depression 8^b, it will be deflected downwardly into the depression as shown at B, thus bringing the blades 12 to a substantially horizontal position as shown at B′. As the shaft 6 continues to rotate in the stationary cam 8, the depending roller 9 will travel downwardly in the depression 8^b until it strikes the rear end portion of the depression as shown at C whereupon the

blades 12 will be tilted, as shown at C'. Roller 9 will then be caused to drag along the concentric portion 8^c of the cam, the blades 12, consequently, being caused to flap over suddenly as the roller 9 passes out of the depression 8^b, this flapping action, supplementing the downward bodily movement of the blades 12, producing a very quick downward displacement of the air and, consequently, accelerating the lifting action exerted by the blades. As the roller continues to travel along the concentric portion 8^c it will maintain the blades 12 practically radial to the shaft 6 until after roller 9 passes off of the lower end of the concentric portion, as shown at D, at which time blade 12 will be free to hang vertically until it assumes the position indicated at E whereupon the operation hereinbefore described will be repeated. Obviously, therefore, the blades will operate to displace air downwardly and will therefore exert a lifting action upon the machine. As one of these elevating wheels is arranged at each end portion of the shaft 6, and as both wheels rotate in unison, it will be seen that the displacement of air at the two sides of the machine and the lateral balance of the machine will be maintained at all times during the operation of the shaft.

As shown in Fig. 5 shaft 6 may be provided at each end with a ball 13 adapted to bear within a socket 14. Thus friction is reduced to the minimum.

Supported by the lower frame 3 is a motor 15 and motion may be transmitted therefrom through a chain 16 to a sprocket 17 secured to shaft 6. A bevel gear 18 is secured to said shaft 6 and meshes with a smaller gear 19 which, in turn, is secured to the rear end of a forwardly extending shaft 20, the front end of this shaft being provided with a propeller 21.

Extending downwardly from the sides of the frame 1 are brackets 22 and journaled in these brackets are transverse shafts 23 each of which carries an elongated controlling plane 24. Each plane has an arm 25 extending downwardly therefrom and these arms are connected by a rod 24'. A controlling cord 26 extends from one of the arms 25 and is extended over a suitably disposed guide sheave 27 to a foot lever 28. Substantially horizontal arms 25' may be extended from the planes 24 and springs 29 can be connected to these arms so as to hold the planes normally horizontally. By depressing foot lever 28, cords 26 can be caused to pull on the arms 25 and thus tilt the planes 24 out of their normal positions, thereby placing the springs 29 under tension or compression so that, when foot lever 28 is released, the springs will return the planes to their initial positions.

For the purpose of steering the machine laterally, a vertical rudder 30 is supported back of the rear sustaining plane 2, this rudder being provided with a stem 31 connected to a rearwardly extending brace 32 so as to swing laterally. Controlling cords 33 extend laterally from this rudder and are guided upon sheaves 34. These cords extend to a spool 35 adapted to be rotated in any suitable manner, as by means of a steering post 36.

It will be apparent that by rotating the propeller 21 the machine will be caused to soar, the upward movement thereof being controlled by the planes 24. After the machine has reached a desired elevation and even while the machine is moving upwardly, the shaft 6 can be caused to rotate the blades 12 and as these blades feather it will be seen that they exert a lifting action, thus assisting in the upward movement of the machine and in maintaining it at a desired elevation.

What is claimed is:—

A flying machine including sustaining planes arranged one in front of the other and spaced throughout the width of the machine, parallel controlling planes below the space between the sustaining planes and extending transversely of the machine, means for tilting the said controlling planes in unison about axes extending transversely of the machine, a transverse shaft journaled below the space between the controlling planes, a blade revoluble with said shaft and also revoluble about its individual axis, said axis being parallel with the shaft, a stationary cam, a crank arm movable with the blade and around the cam, and means coöperating with the cam for engaging the crank arm to swing the blade downwardly about its individual axis during the downward movement of said blade about the axis of the shaft, said blade operating to displace downwardly air flowing through the spaces between the sustaining planes and between the controlling planes.

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

DAVID SMITH.

Witnesses:

BURCHIE P. ANDERSON,

H. M. JONES.