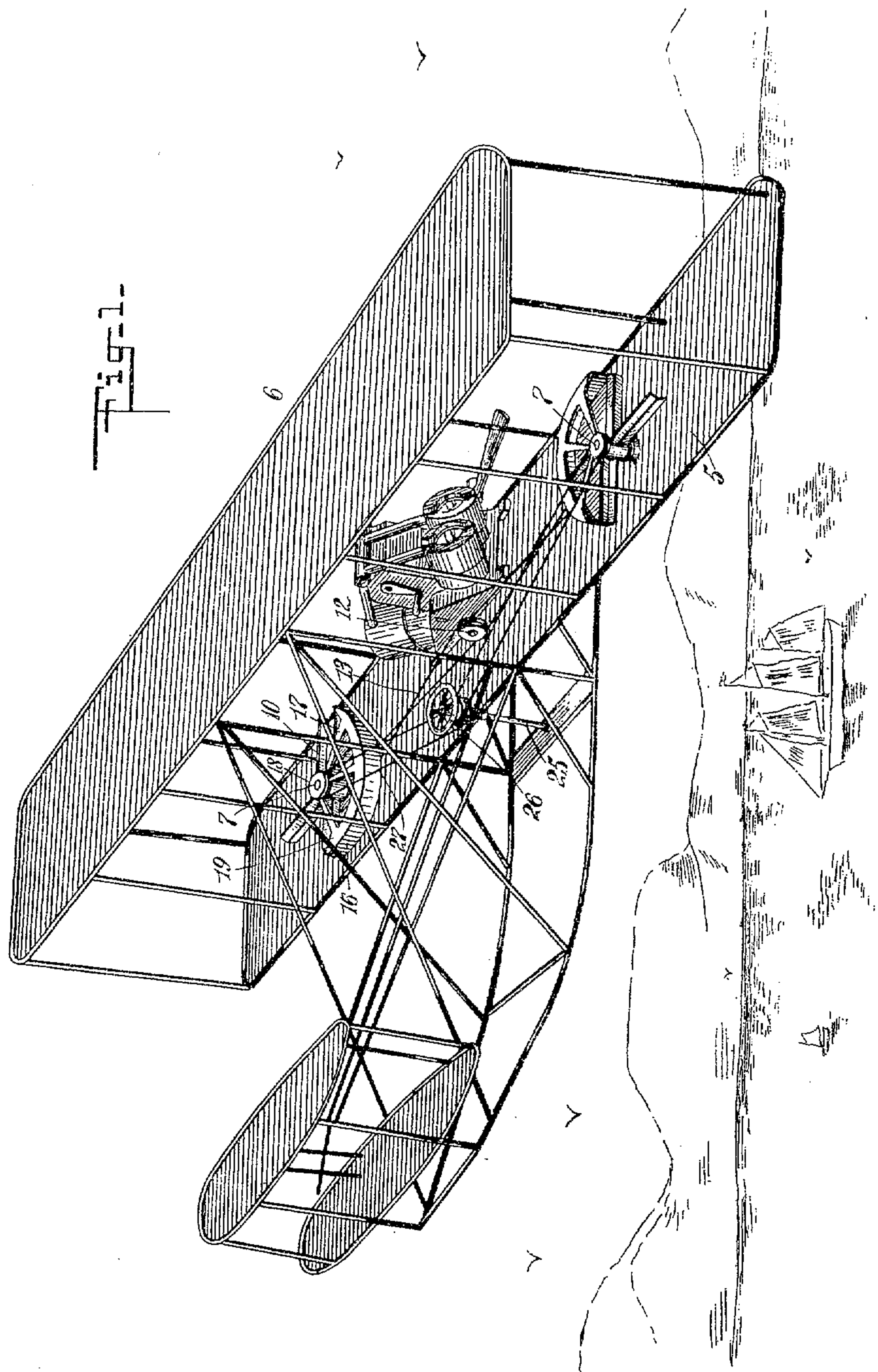


E. HOULT.
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APPLICATION FILED OCT. 28, 1908.

969,627.

Patented Sept. 6, 1910.
3 SHEETS—SHEET 1.



WITNESSES

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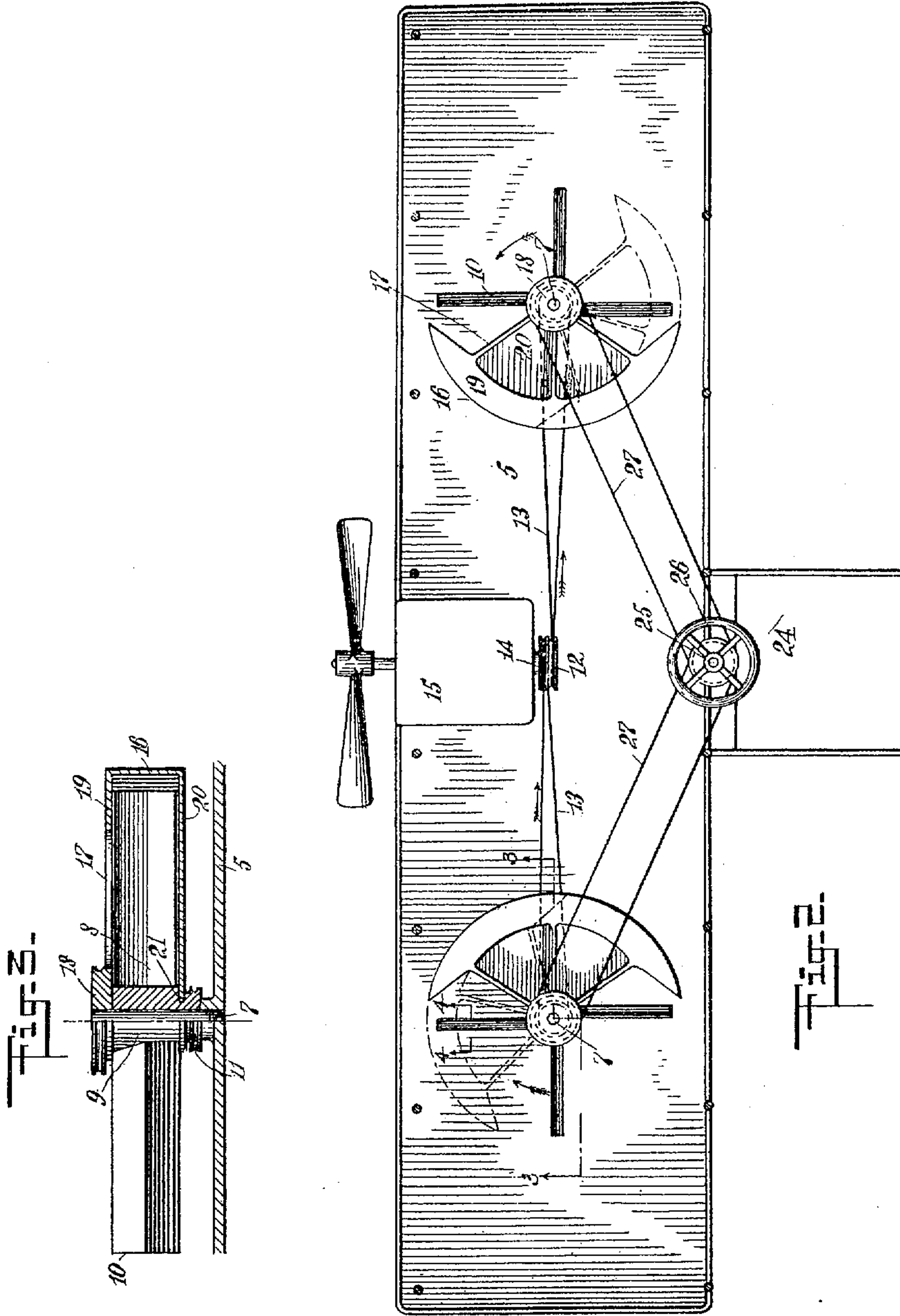
ATTORNEYS

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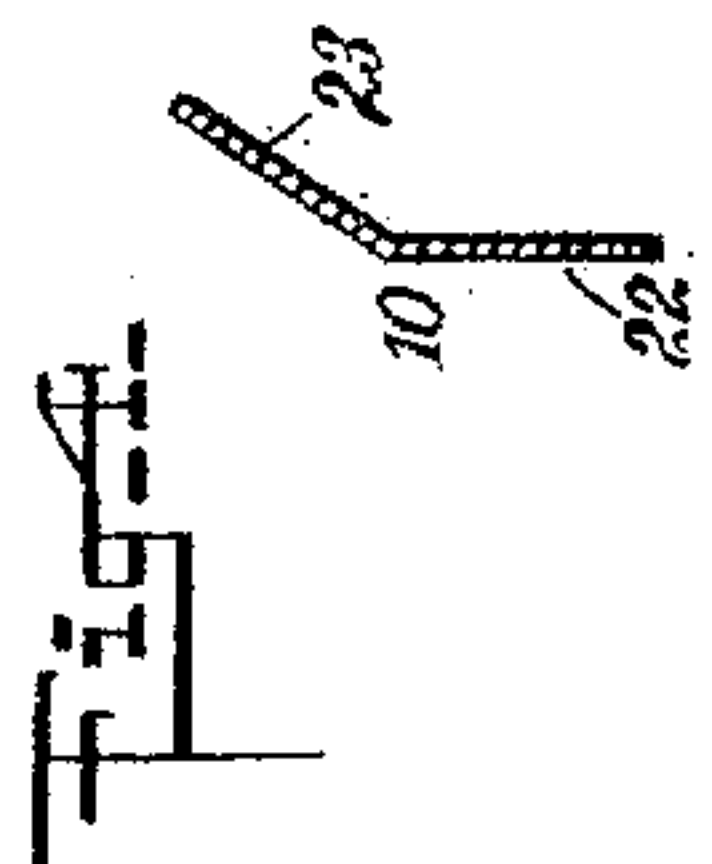
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5.

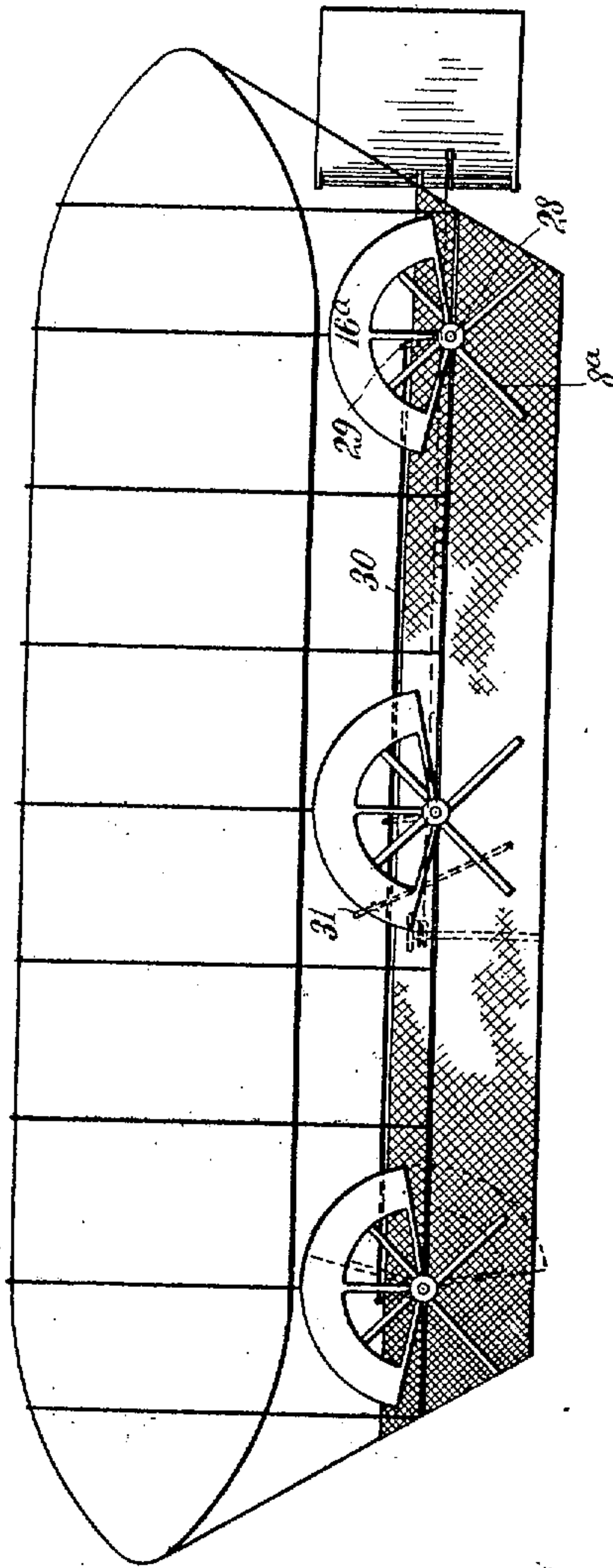
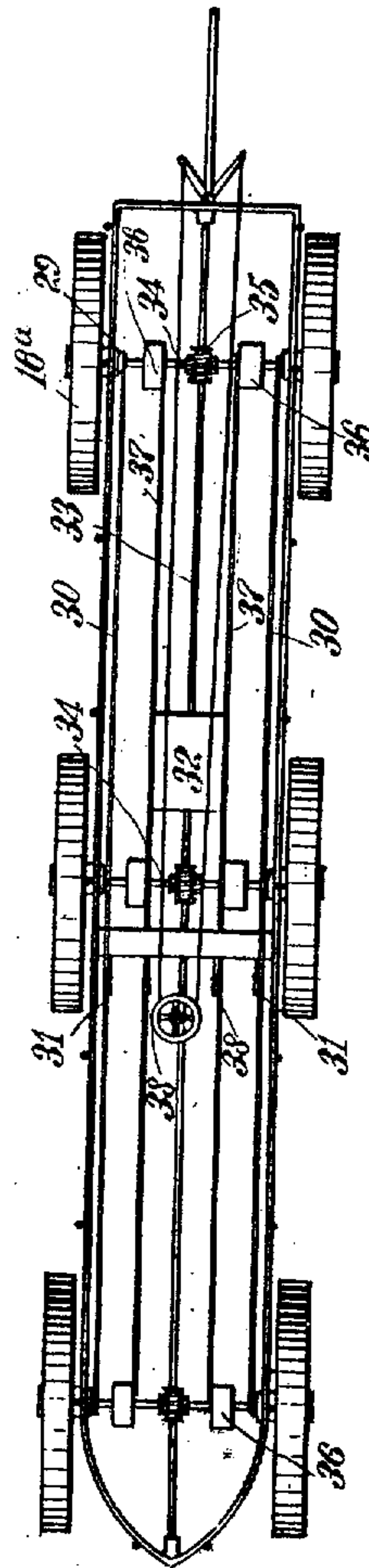


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWARD HOULT, OF NEW WESTMINSTER, BRITISH COLUMBIA, CANADA.

PROPELLING AND STEERING DEVICE FOR AIRSHIPS.

969,627.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed October 28, 1909. Serial No. 525,113.

To all whom it may concern:

Be it known that I, EDWARD HOULT, a subject of the King of Great Britain, and a resident of New Westminster, in the Province of British Columbia and Dominion of Canada, have invented a new and Improved Propelling and Steering Device for Airships, of which the following is a full, clear, and exact description.

My invention relates to airships, and it has for its object to provide curved hoods pivoted concentrically with the propellers, there being means to regulate the position of the curved hoods relatively to the airship, so that the movement of the air at one side of the propellers will be confined. By moving the hoods around their axes, the direction of movement of the airship may be controlled and the airship may be driven forward, backward, to the right or to the left, as desired.

Another object of the invention is to bend the propeller blades in cross section, so that a downward thrust is obtained as the propellers are rotated. By the use of my device, a lifting, pushing, steering and gyroscopic action is obtained.

It will be understood that while my invention is especially adapted for use on aeroplanes, with the axes of the propellers and of the hoods vertically disposed, the invention may also be used on dirigible balloons, with the axes of the propellers and hoods horizontally disposed.

Other objects of the invention will appear in the following complete description.

In this specification I will describe the preferred form of my invention, it being understood that the scope of the invention is defined in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a perspective view of an aeroplane to which my device has been attached; Fig. 2 is a plan view of the lower plane of the aeroplane shown in Fig. 1; Fig. 3 is a sectional view on the line 3—3 of Fig. 2; Fig. 4 is a sectional view on the line 4—4 of Fig. 2; Fig. 5 is a side elevation of a dirigible balloon to which my device has been applied; and Fig. 6 is a plan view.

By referring to the drawings it will be seen that the lower plane 5 of the aeroplane

6, has two vertically disposed shafts 7, mounted on each of which there is a propeller 8 having a hub 9 and propeller blades 10. Below the hub 9 and secured thereto, there are pulleys 11, which are connected to a pulley 12 by belts 13, the pulley 12 being connected to a shaft 14 and an engine 15 by which it is driven. Around each of the propellers 8 there is a curved hood 16, the hoods being disposed substantially one-third the distance around the paths of the terminals of the propeller blades 10. The hoods 16 are disposed concentrically with the axes of the propellers, and they have arms 17, which are secured to pulleys 18 mounted on the shafts 7, respectively. The hoods 16 have flanges 19 disposed inwardly a short distance from their periphery, these flanges 19 being positioned at the top of the hoods, there being sector plates 20, secured to the periphery of the hoods on their lower inner ends, the inner ends of these sector plates 20 being disposed in grooves 21 in the hubs 9 of the propellers 8.

As shown in Fig. 4 of the drawings in cross section, the lower portions 22 of the propeller blades 10 are disposed vertically, while the upper portions 23 of the propeller blades are disposed at an angle of approximately 150 degrees, this construction being provided so that as the propellers are rotated, the upper portions 23 of the propeller blades will tend to force the air downwardly, thereby raising the airship.

The steering wheel 24, is mounted on a shaft 25, in the center line of the aeroplane, there being a pulley 26 which is secured to this shaft 25, the pulleys 18 on the hoods being connected with the pulley 26 by means of belts 27. As the hoods are disposed one on either side of the shaft 25, and as neither of the belts 27 is crossed, it will be understood that as the steering wheel 24 is operated, it will tend to rotate the pulleys 18 and the hoods 16 in opposite directions. In the construction shown in Figs. 5 and 6, of the drawings, shafts 28 are mounted horizontally, and hoods 16^a and propellers 8^a are mounted thereon in the manner shown in the other views of the drawings, the pulleys 18 serving as hubs only, there being levers 29 secured to these hubs, and links 30 which are articulated to the levers 29 and which are operated by levers 31.

In the modification shown in Figs. 5 and 6 of the drawings, there is an engine 32, which

drives a shaft 33, which in turn drives shafts 34, by worm gears 35, the shafts 34 being connected with the shafts 28 by means of changeable gears disposed in braces 36, the changeable gears being adapted to be operated by means of links 37, which are in turn operated by levers 38. With this mechanism, the propellers at one side of the airship may be driven faster than the propellers on the other side, whereby together with the hoods and the means for operating those disposed on one side of the airship independently of those at the other side, the airship may be maneuvered with the greatest ease.

In operating the device, the engine is started and, by the mechanism which has been described, the propellers 8 are driven, and when the hoods 16 are disposed in the position shown by full lines in Fig. 2 of the drawings, the aeroplane will be driven forward in a straight line, the propellers tending to raise the aeroplane. When the hoods are moved to the positions shown in dotted lines in Fig. 2 of the drawings, the direction of the aeroplane will be changed so that it will move to one side. During this movement of the propellers 8 they will have the desired gyroscopical effect and will tend to keep the aeroplane on a level. When the modified form of the device is used, the hoods 16^a will be disposed above the propellers 8^a, but by a movement of the levers 29 they may be rocked on the shafts 28 so that they will be rearwardly disposed, which will tend to cause the balloon to ascend or, if desired, the hoods 16^a at one side of the machine may be moved relatively to the others, to produce a change of direction in the course of the aeroplane, or to balance any abnormal movement caused by a heavy wind.

It should be kept in mind that my invention may be used on steamships, etc., as well as on air ships.

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

1. In an airship, two propellers spaced apart, the blades of the propellers being angular in cross section, the propellers having

vertical axes, curved hoods pivoted substantially concentrically with the propellers, which are disposed for a distance around the circles made by the terminals of the propeller blades when the propellers are operated respectively, and means adapted for rotating the hoods simultaneously in opposite directions.

2. In an airship, two propellers spaced apart, having vertical axes, the blades of the propellers being angular in cross section, having their lower portions disposed substantially vertically, their upper portions being disposed at angles thereto respectively, curved hoods pivoted substantially concentrically with the propellers, which are disposed for a distance around the circles made by the terminals of the propeller blades when the propellers are operated respectively, and means adapted for rotating the hoods simultaneously in opposite directions.

3. In an airship, a body, an axle secured thereto, a propeller mounted on the axle, there being a pulley at one end of the hub of the propeller, and a curved hood having a pulley, the curved hood being disposed around the propeller with its pulley disposed on the axle in close proximity to the other end of the propeller.

4. In an airship, a body, an axle secured thereto, a propeller mounted on the axle, there being a pulley at one end of the hub, there being also an annular groove in the hub, the propeller blades being angular in cross section, a curved hood having a pulley, the curved hood being disposed around the pulley with its pulley around the axle in close proximity to the other end of the hub of the propeller, and a sector member secured to the curved hood, the inner end of the sector member being disposed in the groove in the hub.

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

EDWARD HOULT.

Witnesses:

B. S. BROWN,
WALTER J. WALKER.