

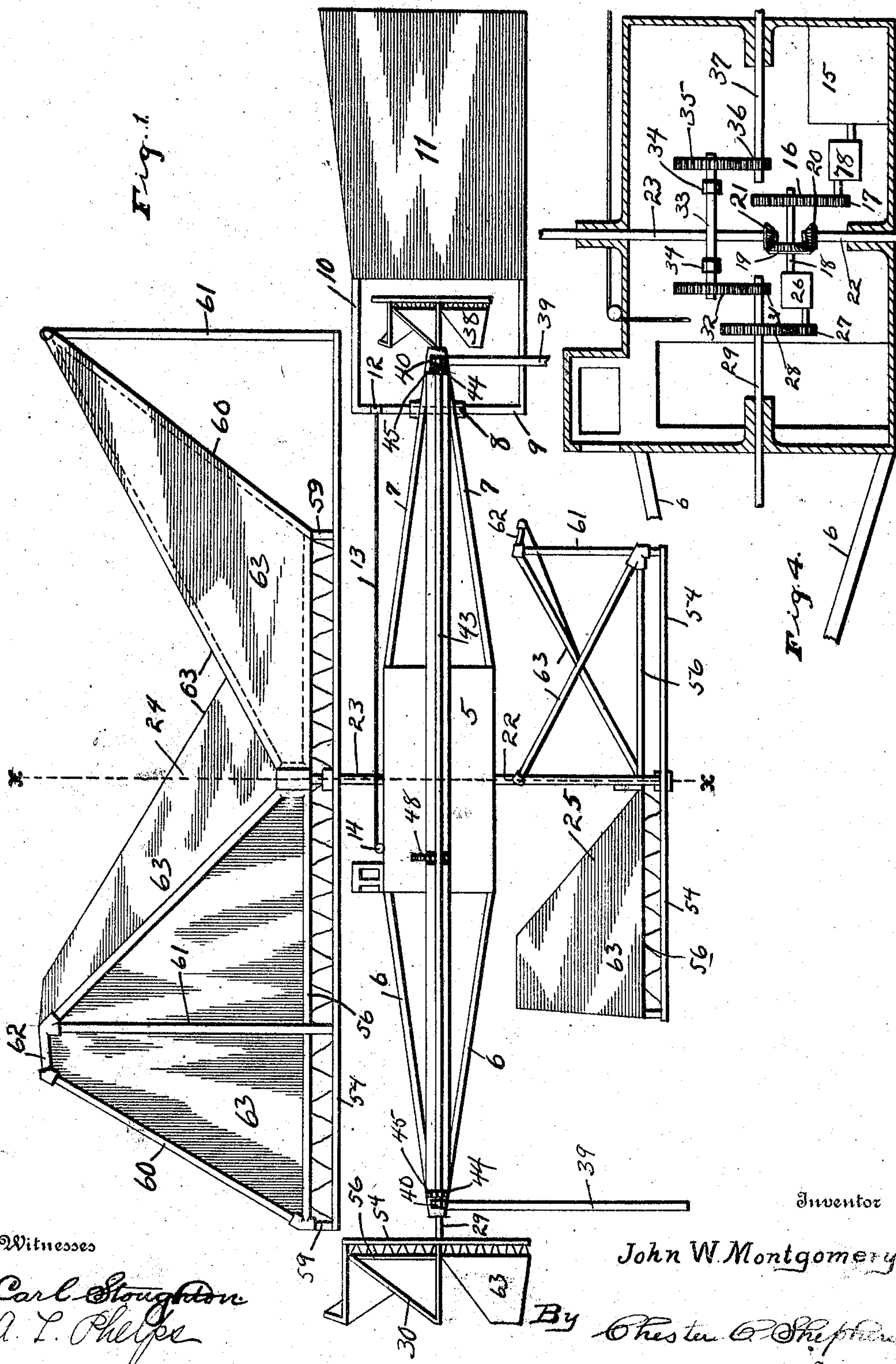
No. 881,327.

J. W. MONTGOMERY.  
AIR SHIP.

PATENTED MAR. 10, 1908.

APPLICATION FILED OCT. 9, 1907.

3 SHEETS—SHEET 1.



Witnesses

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A. L. Phelps

Inventor

John W. Montgomery

By

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3 SHEETS—SHEET 2.

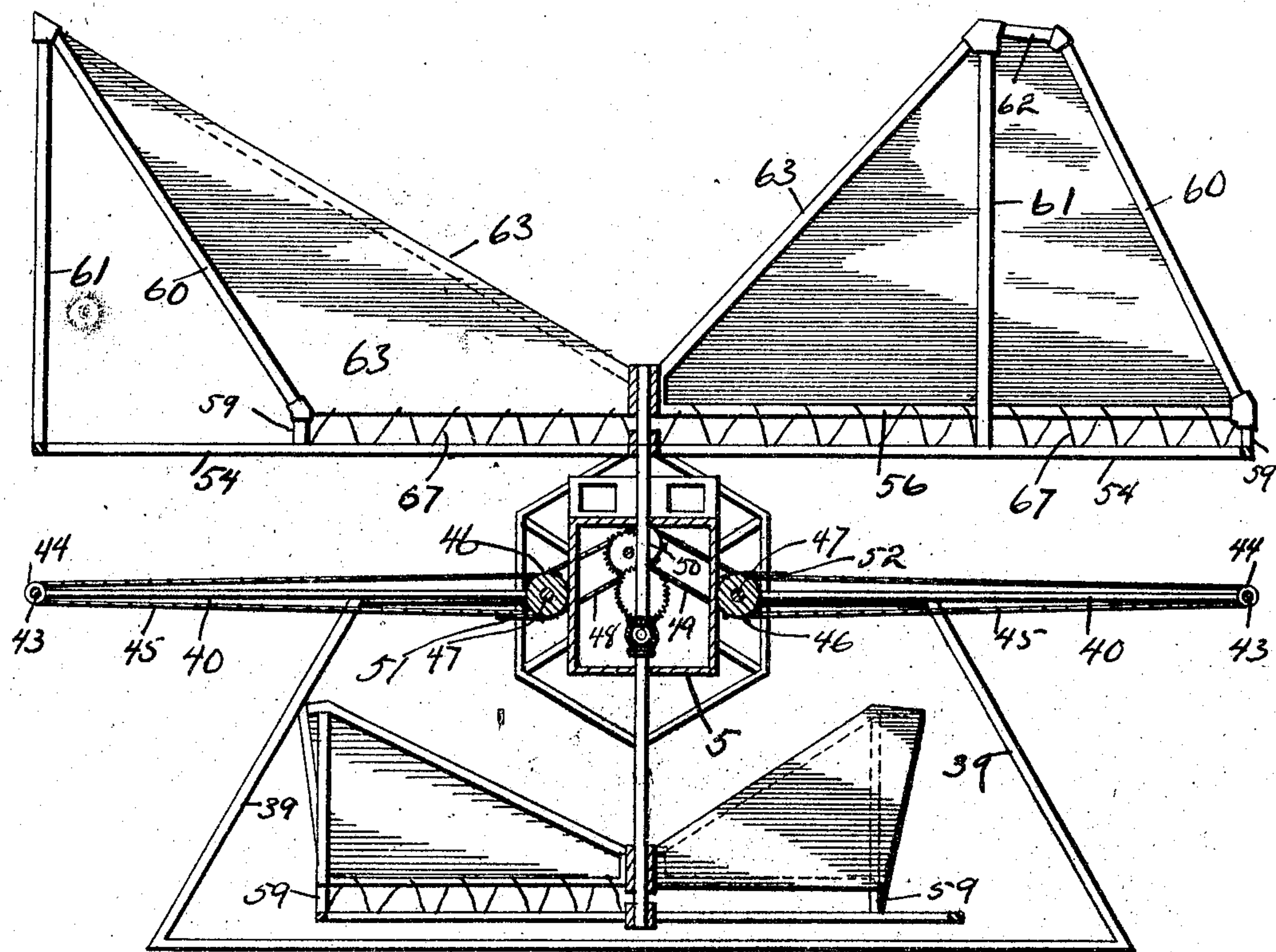


Fig. 2.

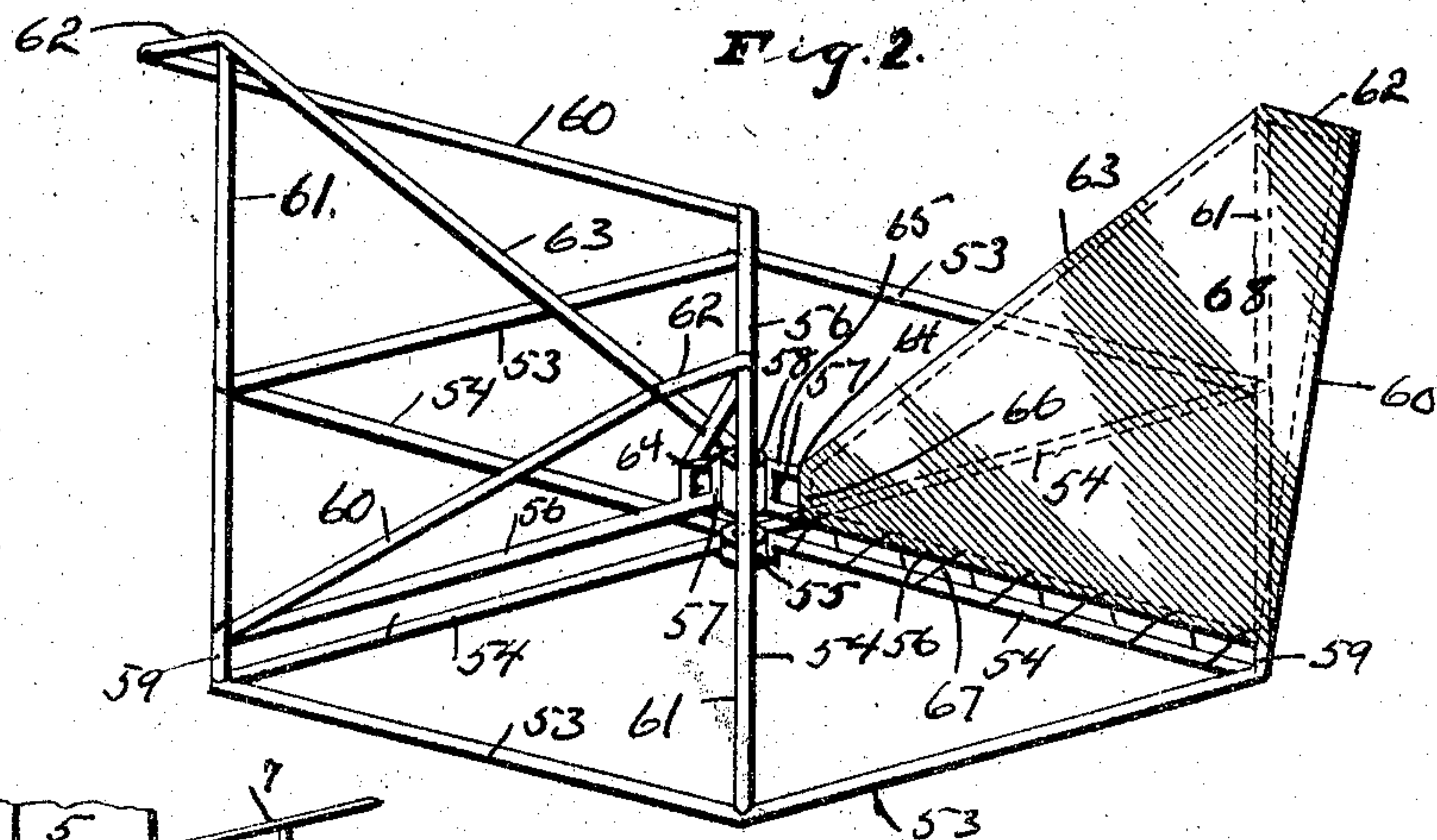


Fig. 3.

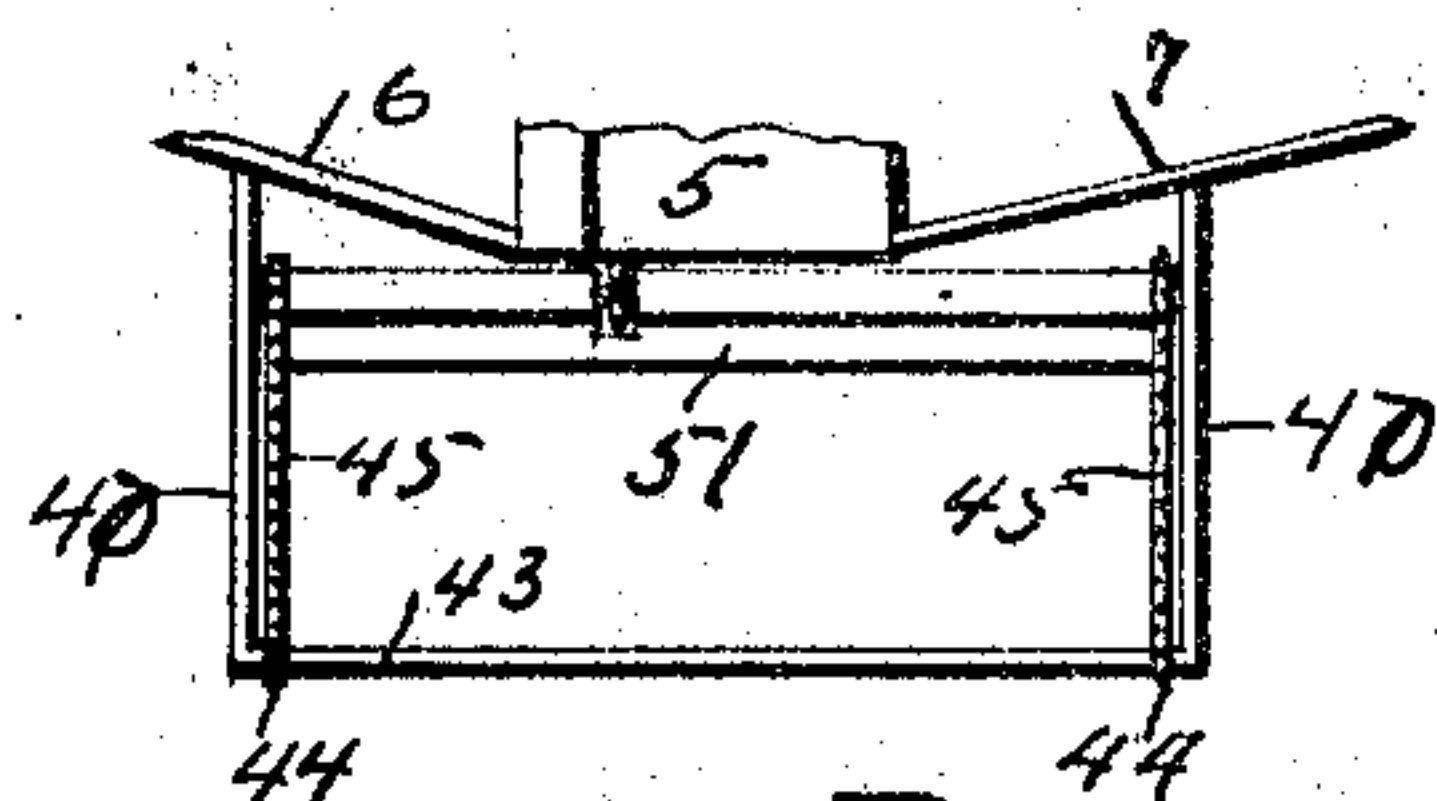


Fig. 5.

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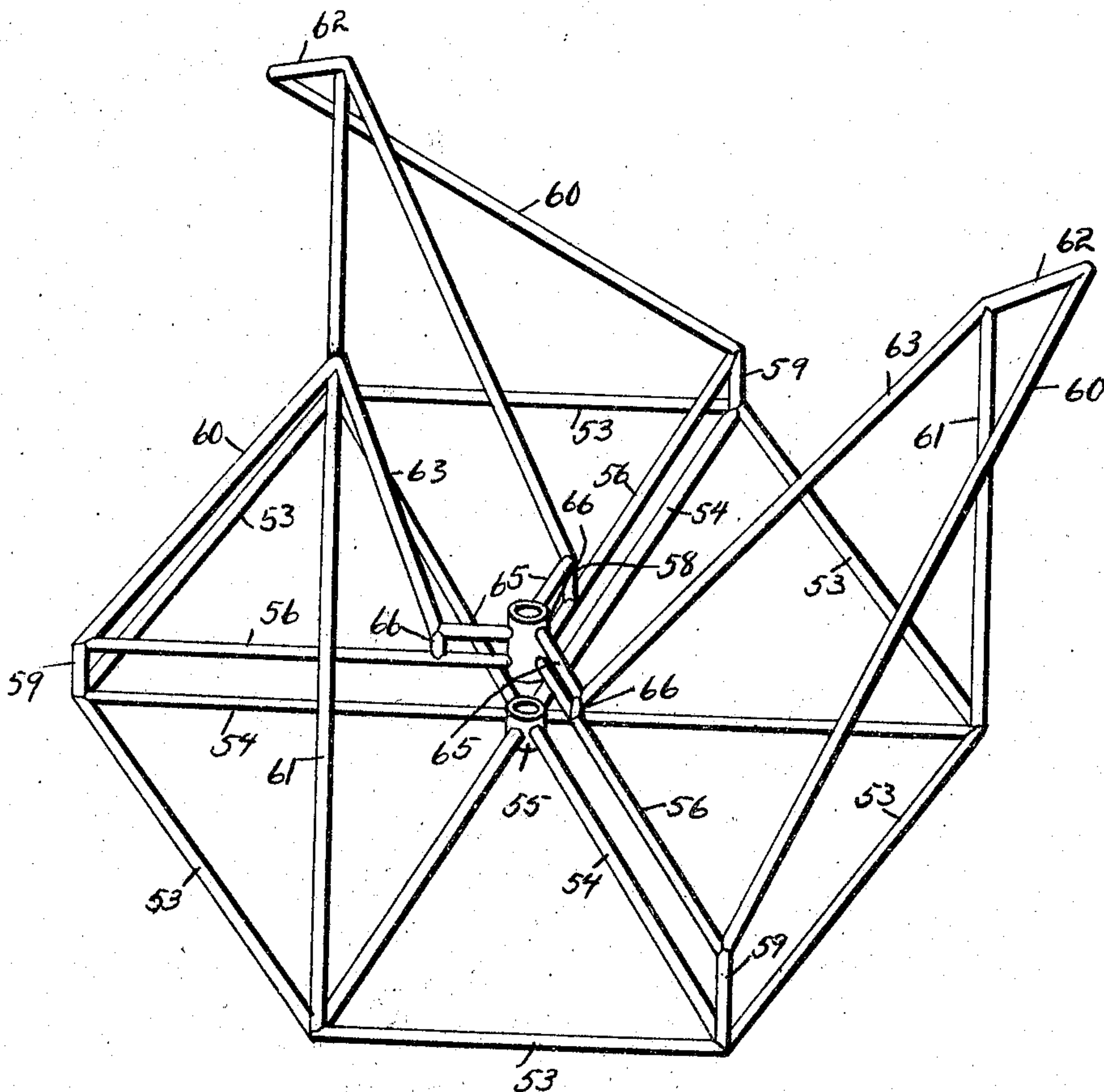


Fig. 6.

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# UNITED STATES PATENT OFFICE.

JOHN W. MONTGOMERY, OF COLUMBUS, OHIO, ASSIGNOR TO SARAH J. MONTGOMERY, OF COLUMBUS, OHIO.

## AIR-SHIP.

No. 881,377.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed October 9, 1907. Serial No 306,540.

To all whom it may concern:

Be it known that I, JOHN W. MONTGOMERY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Air-Ships, of which the following is a specification.

My invention relates to air ships and has for its object the provision of a device of this character provided with improved lifting means adapted to lift the vessel bodily under the influence of a powerful motor and without the use of a gas bag.

A further object of the invention is the provision of improved lifting and driving wheels for devices of this character, these wheels being constructed in such manner as to present a great lifting area to the air while at the same time being constructed in such manner that they will be very light.

Further objects and advantages of the invention will be set forth in the detailed description which now follows.

In the accompanying drawings: Figure 1 is a side elevation of an air ship constructed in accordance with the invention, Fig. 2 is a transverse vertical section through said air ship upon line x—x of Fig. 1, Fig. 3 is a detail perspective view of one of the lifting or driving wheels with the canvas covering omitted from a portion thereof, Fig. 4 is a detail sectional view illustrating the arrangement of the motor parts, Fig. 5 is a partial plan view illustrating the arrangement of side wings hereinafter described and Fig. 6 is a perspective view of one of the lifting wheels with the canvas covering removed.

Referring to the drawing, the numeral 5 designates a housing, from which forwardly extending struts 6 and rearwardly extending struts 7 extend. A vertical bearing 8 located at the rear of the frame receives a vertical shaft 9 which comprises a portion of a rudder frame 10. The rear portion of this frame is covered with canvas or like light material 11. Extensions 12, only one of which is shown, project from opposite sides of the shaft 9 and cords 13 secured to these extensions extend forwardly and over pulleys 14 to the interior of the housing 5 where

they may be grasped to swing the rudder from side to side, or they may be secured to a steering wheel, if desired.

A motor 15 is located within the housing 5 and is adapted to impart movement to a gear wheel 16. This gear wheel meshes with a pinion 17 and a transmission gear 78 of any desired construction and which forms no part of the present invention, is interposed between the pinion 17 and the motor. The gear wheel 16 is mounted upon a shaft 18 and this shaft carries a gear wheel 19 which meshes with pinions 20 and 21. The pinion 20 is upon a downwardly extending vertical shaft 22 and the pinion 21 is upon an upwardly extending vertical shaft 23. The lifting wheels 24 and 25 are mounted upon these shafts 22 and 23 and the detail construction of these wheels will be hereinafter set forth.

The shaft 18 is connected by a transmission gear 26 with a pinion 27 and this pinion meshes with a gear wheel 28 which is fast upon a forwardly projecting shaft 29. At the front end of this forwardly projecting shaft is a propelling wheel 30, the detail construction of which is similar to the detail construction of the lifting wheels 24 and 25. The shaft 29 carries a pinion 31 which meshes with a gear wheel 32 and is fast upon a shaft 33, this shaft 33 being mounted in bearings 34. The shaft 33 carries a large gear wheel 35 which is fast upon a rearwardly extending shaft 37. This rearwardly extending shaft carries at its rear end a propelling wheel 38 that is similar in construction to the propelling wheel 30. Supports 39 extend downwardly from the outer ends of the members 6 and 7 and serve to hold the wheel 25 away from the ground when the ship is at rest.

At each end of the framework formed by the housing and the members 6 and 7 and upon each side of the ship, rigid outwardly extending rods 40 are arranged (see Figs. 1 and 2). These rods are provided at their outer ends with bearings for shafts 43 and these shafts carry sprocket wheels 44 over which sprocket chains 45 pass. These sprocket chains also pass over sprocket wheels 46 which are mounted upon longitudi-



nally extending shafts 47 and these shafts are driven by sprocket chains 48 and 49 from a sprocket wheel 50 which is located within the housing 5. Motion may be imparted to the sprocket wheel 50 by any desired means. I prefer to actuate this sprocket wheel manually. Wound upon these shafts 47 are sheets of canvas 51 which are connected at 52 to the sprocket chains 45 in such manner that when motion is imparted to these sprocket chains from the sprocket wheel 50, these sheets of canvas will be drawn outwardly.

In their detail construction the wheels 24, 25, 30 and 38 are exactly alike and referring to Fig. 3, this construction will now be described: Each of these wheels comprises a rim 53 which is substantially hexagonal in form and is connected by radial spokes 54 with a hub 55. A second radial spoke 56 is arranged just above every alternate radial spoke 54, and the inner ends of these spokes 56 are upturned as at 57 and secured to a second hub 58 which lies in alignment with the hub 55. Vertically disposed members 59 connect the spokes 54 and 56 at their outer ends and from the juncture of these spokes, upwardly extending members 60 are inclined toward the next spoke head. The members 60 are inclined outwardly also to a slight extent and substantially vertical members 61 are connected to the members 60 by a member 62. An inclined bar 63 extends from the juncture of the members 61 and 62 to a point 64 and is then connected by a short piece 65 with the hub 58. Vertical members 66 further brace and strengthen the structure.

In Fig. 3 only one of the wings or canvas coverings has been illustrated. This covering is secured to the members 60, 62 and 63 and is laced down over the spoke 56 and to the spoke 54 as at 67 and it is this canvas surface that acts against the air to lift the ship or to drive it forward as the case may be. The canvas covering 68 has been omitted from the rest of the skeleton framework of the wheel in Fig. 4 to preserve the clearness of the drawing. It will be seen, however, that there are three supporting surfaces for these canvas frames upon each of the wheels. The purpose of providing the gear wheels 32 and 35 and the shaft 33 instead of running the shafts 29 directly over to the shaft 37 is to clear the shaft 23, for the shafts 23 and 37 are in central alignment with the housing and some means for permitting one of these shafts to clear the other must be provided.

The operation of the device is as follows: When power is applied to the lifting wheels 24 and 25 from the motor, the large surfaces presented by the lifting wheel acting under the influence of a very powerful motor, will lift the machine bodily from the ground,

while the wheels 30 and 38 will propel it forward. It is designed to drive the lifting wheels at substantially a given rate of speed and to control the lifting power, the wings formed by the canvas sheets 51 are provided, for if the machine be rising at a given rate of speed and these canvas sheets be moved outwardly a short distance, they will serve to check the rise of the ship by virtue of the fact that air from the large lifting wheel 24 will strike against them. The wheel 24 extends over the entire length of the ship and while being extremely light, presents a very large area to come upon the air in lifting the ship.

What I claim, is:

1. In a device of the character described, the combination with a supporting framework, of a motor carried by said framework, horizontally disposed lifting wheels driven by said motor, and wings adapted to be moved outwardly beneath one of said lifting wheels for the purpose set forth, said wings at all times lying in the downwardly moving current of air from the lifting wheel.

2. In a device of the character described, the combination with a supporting framework, of a motor carried by said framework, an upwardly extending shaft driven by said motor, a lifting wheel carried by said upwardly extending shaft, a downwardly extending shaft driven by said motor, a lifting wheel carried by said downwardly extending shaft, a forwardly extending shaft driven by said motor, a propelling wheel carried by said forwardly extending shaft, a rearwardly extending rudder, means for actuating said rudder from the supporting framework, and outwardly movable horizontally disposed wings adapted to be moved outwardly beneath the uppermost lifting wheel, said wings at all times lying in the downwardly moving current of air from the lifting wheel.

3. A wheel of the character described comprising a rim, a hub, and a plurality of radial spokes connected to said hub, of a plurality of radial spokes disposed in advance of each of the first named radial spokes, vertically disposed members extending upwardly from the juncture of the rim and each of the first named radial spokes that lies in advance of the last named radial spokes, inclined members connecting the upper ends of said upwardly extending members with the last named radial spokes, inclined members connecting said upwardly extending members with the outer ends of the last named spokes, and coverings carried by said members, substantially as shown and described.

4. A wheel of the character set forth, comprising a rim, a plurality of radial spokes 54 connected to said rim, and a hub to which said spokes are connected, a plurality of supplemental radial spokes 56 disposed over



every other radial spoke 54, a plurality of vertically disposed members 61 extending upwardly from the juncture of every other spoke 54 with the rim, a centrally disposed supplemental hub 58, inclined members 63 connecting the vertically disposed members 61 and hub 58, inclined members 60 connecting the vertically disposed members 61 and

the spokes 56, and canvas coverings 68 secured to the members 60, 63 and 54.

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In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. MONTGOMERY.

Witnesses:

A. L. PHELPS,

L. CARL STOUGHTON.