

J. HUGHES.
AEROPLANE.

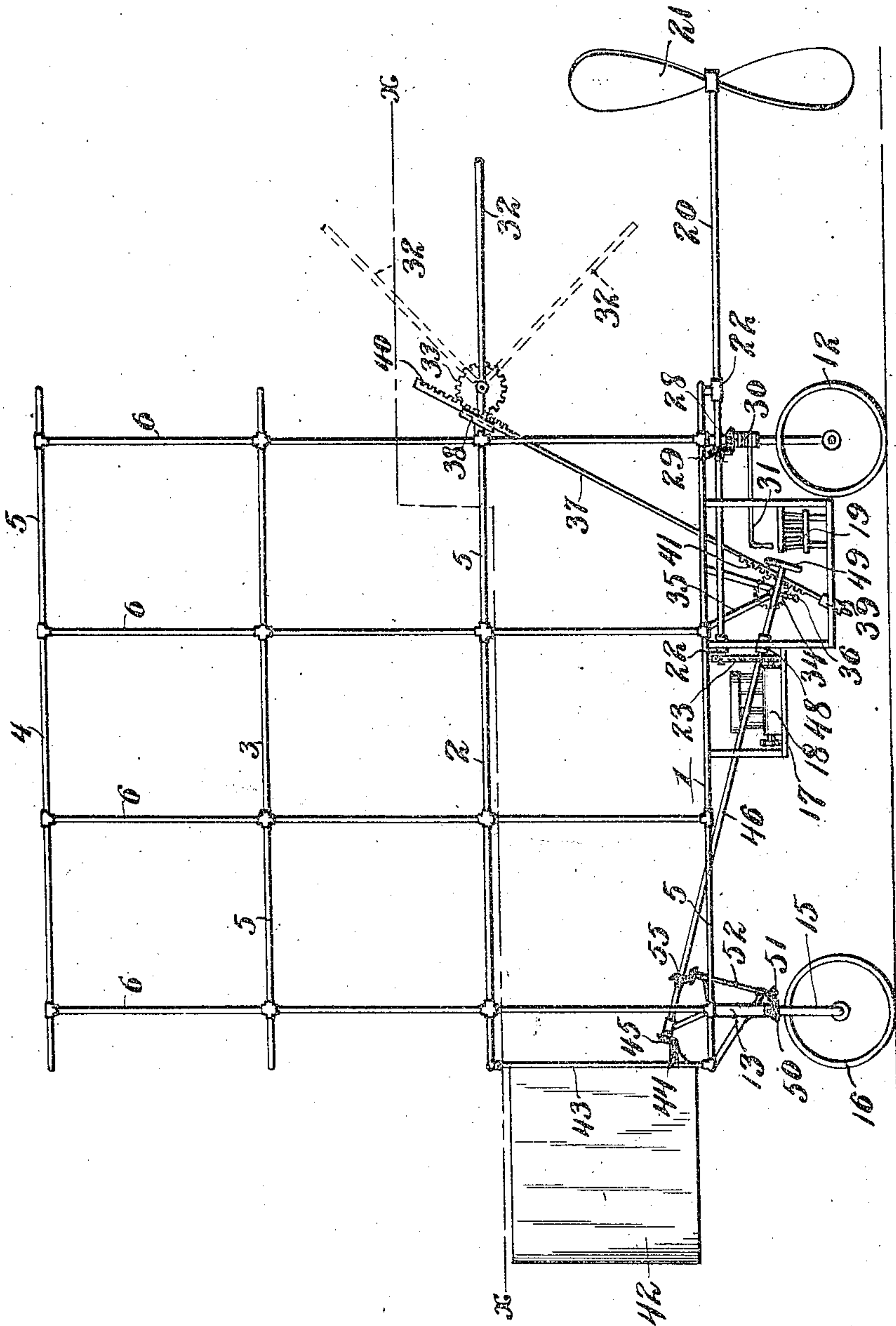
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991,620.

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2 SHEETS—SHEET 1.

Fig. 1.



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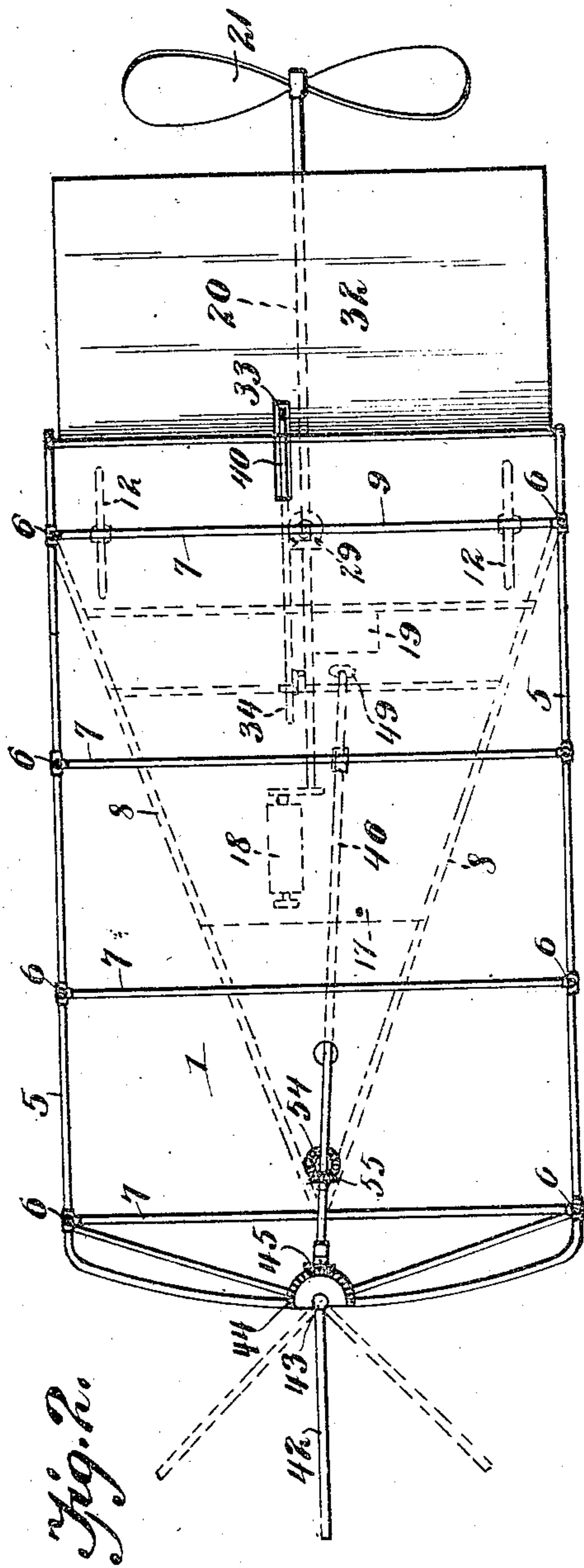


Fig. 2.

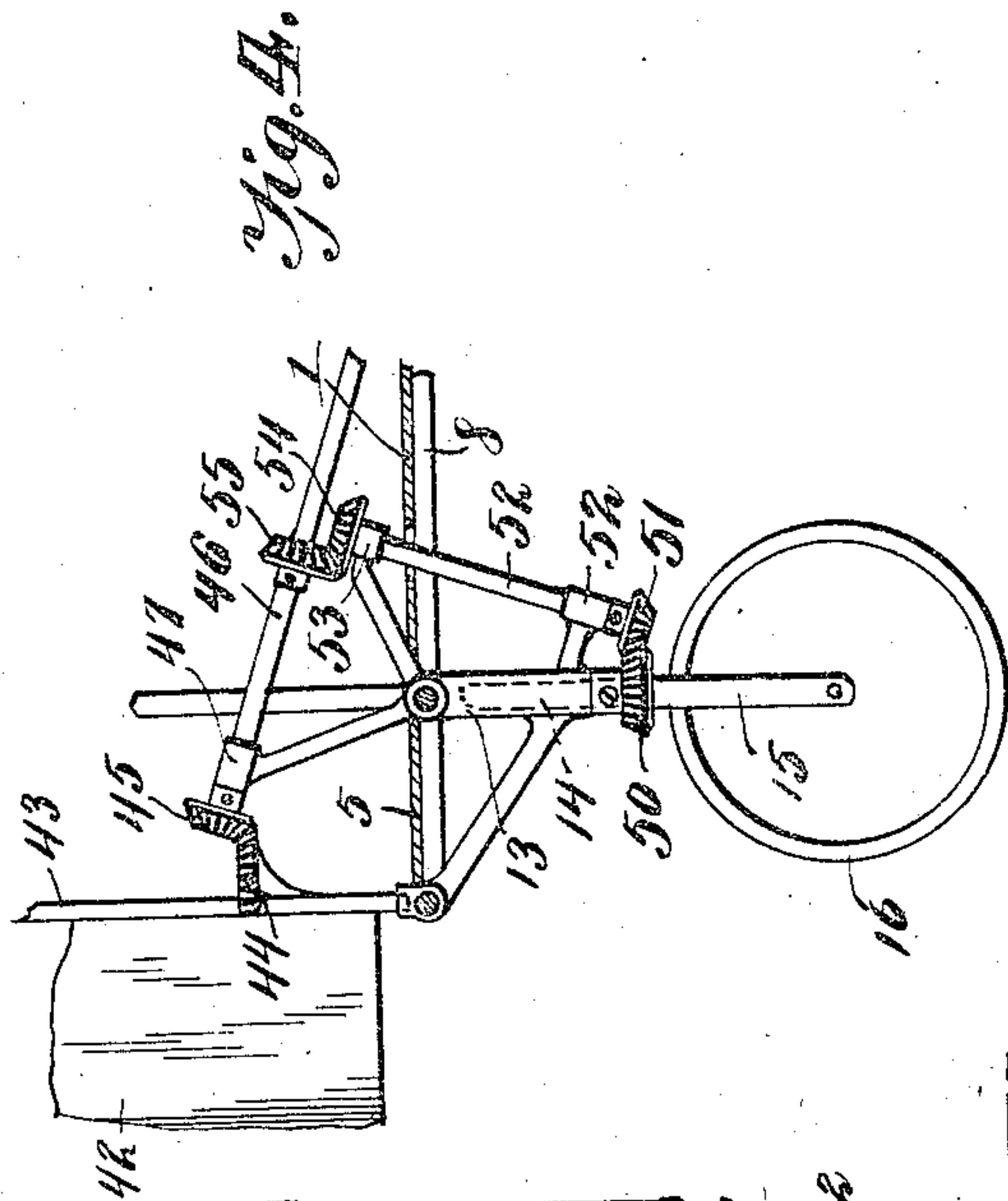


Fig. 4.

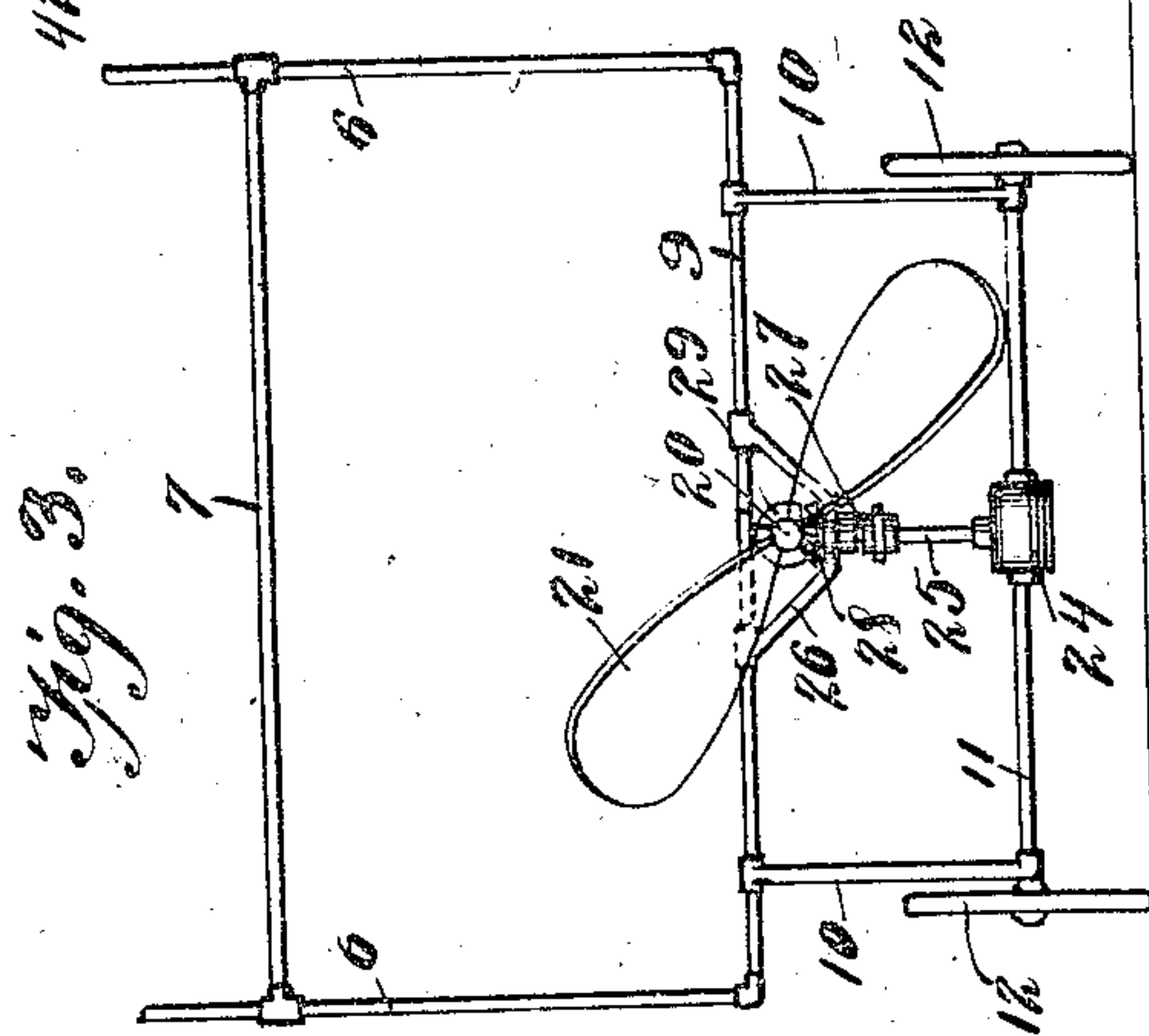


Fig. 3.

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AEROPLANE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN HUGHES, a citizen of the United States, residing at Baker, county of Custer, and State of Montana, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

My invention relates to aeroplanes, and the object of my invention is to provide an aeroplane of improved construction whereby perfect, or substantially perfect equilibrium is assured and wherein planes of much smaller dimensions may be employed than are now generally considered necessary.

A further object of my invention is to provide an improved aeroplane capable of traveling both on land and through the air and equipped with its own motive power capable of imparting to the device its initial momentum necessary to begin its flight.

A further object of my invention is to provide a device as mentioned wherein the motor may be coupled to propelling mechanism for driving the same on land or to propelling mechanism for driving the same through the air and wherein the change may be made readily from one to the other as desired.

A further object of my invention is to provide improved means for steering or guiding the device either on land or in the air.

Other objects will appear hereinafter.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification and in which—

Figure 1 is a side elevation of an aeroplane embodying my invention in its preferred form, Fig. 2 is a horizontal section taken on the line $x-x$ of Fig. 1, Fig. 3 is a rear elevation of the lower portion of the device, and Fig. 4 is a detail view upon an enlarged scale illustrating the forward portion of the steering mechanism.

In carrying out my invention I provide a plurality of preferably similar planes of comparatively small size arranged one above the other and connected by a suitable frame. Beneath the lowermost plane is arranged a truck or frame provided with running gear and the motor and seat for the operator. By arranging these portions of the device beneath a number of superimposed planes

substantially perfect equilibrium is assured while the device is in motion.

The device is provided with a propeller and propeller shaft connected to the motor and suitable clutch mechanism is provided for connecting the drive wheels of the running gear to said shaft when desired to start the device. The front end of the machine is provided with a vertical rudder and also a steering wheel for directing the lateral course or turning of the device and these are operated by a single shaft whereby greater simplicity of construction and operation is obtained. The rear end of the device is equipped with a rudder mounted to swing on a horizontal axis to raise or lower the device in the air and equipped with improved means for controlling the same.

Referring now to the drawings 1, 2, 3 and 4 indicate a plurality of substantially rectangular planes arranged one above the other and connected by a suitable frame. Any number of planes may be employed depending upon the amount of weight the device is designed to carry. Each plane is provided with a peripheral frame 5 and the frames 5 are connected by a plurality of vertical frame members 6. Horizontal transverse members 7 extending from side to side of the planes complete the frame of the upper portion of the device.

Arranged directly beneath the lowermost plane 1 is a horizontal triangular frame consisting of the diverging members 8—8 which are united at their forward ends on the transverse axis and connected at their rear ends by a transverse member 9. Extending downwardly from the member 9, adjacent the outer ends thereof are a pair of arms or brackets 10 in the lower ends of which is mounted a transverse shaft 11 carrying a pair of wheels 12 forming a portion of the running gear. Extending downwardly from the forward end of the triangular frame is a sleeve 13 in which is rotatably mounted a vertical shaft 14 carrying a fork 15 at its lower end in which is mounted a front wheel 16 by means of which the device may be steered when running on the ground. The steering mechanism will be described in detail hereinafter. Arranged beneath the lowermost plane and supported from the triangular frame is a frame 17 carrying a motor 18 and a seat 19 for the operator.

20 indicates a longitudinally disposed shaft equipped with a propeller 21. The shaft 20 is mounted in brackets 22 beneath the lower plane 1 and is connected to the motor 18 by suitable gearing 23.

The shaft 11 is provided with transmission gearing 24 from which extends a vertical shaft 25 having its upper end journaled in a bracket 26, or more accurately in a sleeve 27 itself journaled in the bracket. The upper end of the sleeve 27 is provided with a beveled gear 28 meshing with a gear 29 on the propeller shaft, and suitable clutch mechanism 30 is provided for coupling the sleeve 27 to the shaft 25 when desired. When the device is in operation the sleeve 27 is driven continuously with the shaft 20 and when the clutch 30 is thrown into operation by the lever 31 the power will be transmitted to the wheels 12 for starting the device. As soon as the device leaves the ground the clutch 30 is thrown out of operation, uncoupling the wheels 12 from the motor and permitting all of the power of the motor to be employed in driving the propeller.

Mounted upon the rear of the plane 2 is a rudder 32 adapted to swing upon a horizontal axis to raise or lower the device. The rudder 32 is provided with a gear 33 secured to the same and with its axis coinciding with the axis of said rudder; and a similar gear 34 is mounted in a bracket 35 adjacent the seat 19 and provided with a crank or handle 36 for turning the same.

37 indicates a bar or rod mounted in brackets 38 and 39 and equipped with racks 40 and 41 meshing with the gears 33 and 34 respectively. It is obvious that by turning the gear 34 the rudder 32 will be elevated or lowered as desired.

Arranged at the forward end of the device, preferably between the planes 1 and 2 is a rudder 42 mounted to swing upon a vertical axis 43, for turning the device to the right or left as desired. Fixed to the axis

43 is a segmental beveled gear 44 which meshes with a beveled pinion 45 fixed to a shaft 46. The shaft 46 is mounted in brackets 47 and 48 and extends diagonally downwardly toward the operator's seat and is equipped with a hand wheel 49 adjacent said seat whereby said shaft and the rudder 42 may be turned.

Secured to the shaft 14 above the fork 15 is a gear 50 which meshes with the gear 51 on a shaft 52. The shaft 52 is mounted in brackets 53 and extends upwardly to a point adjacent the shaft 46.

54 and 55 indicate beveled gears on the shafts 52 and 46 respectively. It is obvious that by turning the shaft 46 the operator may guide the machine to the right or left whether on land or in air and it should be noted that the turning of the shaft in one direction will direct the machine in the same direction whether on land or in air. A single guiding device therefore serves both purposes.

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

In an aeroplane, a plurality of superimposed planes, a frame connecting said planes, running gear arranged beneath the lowermost plane and including a pair of drive wheels and a steering wheel, a forwardly projecting rudder mounted at the front of the frame to swing upon a vertical axis, a gear on said rudder, a manually operable shaft, a gear on said shaft meshing with the gear on said rudder, and suitable connections between said shaft and said steering wheel, substantially as described.

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

JOHN HUGHES.

Witnesses:

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