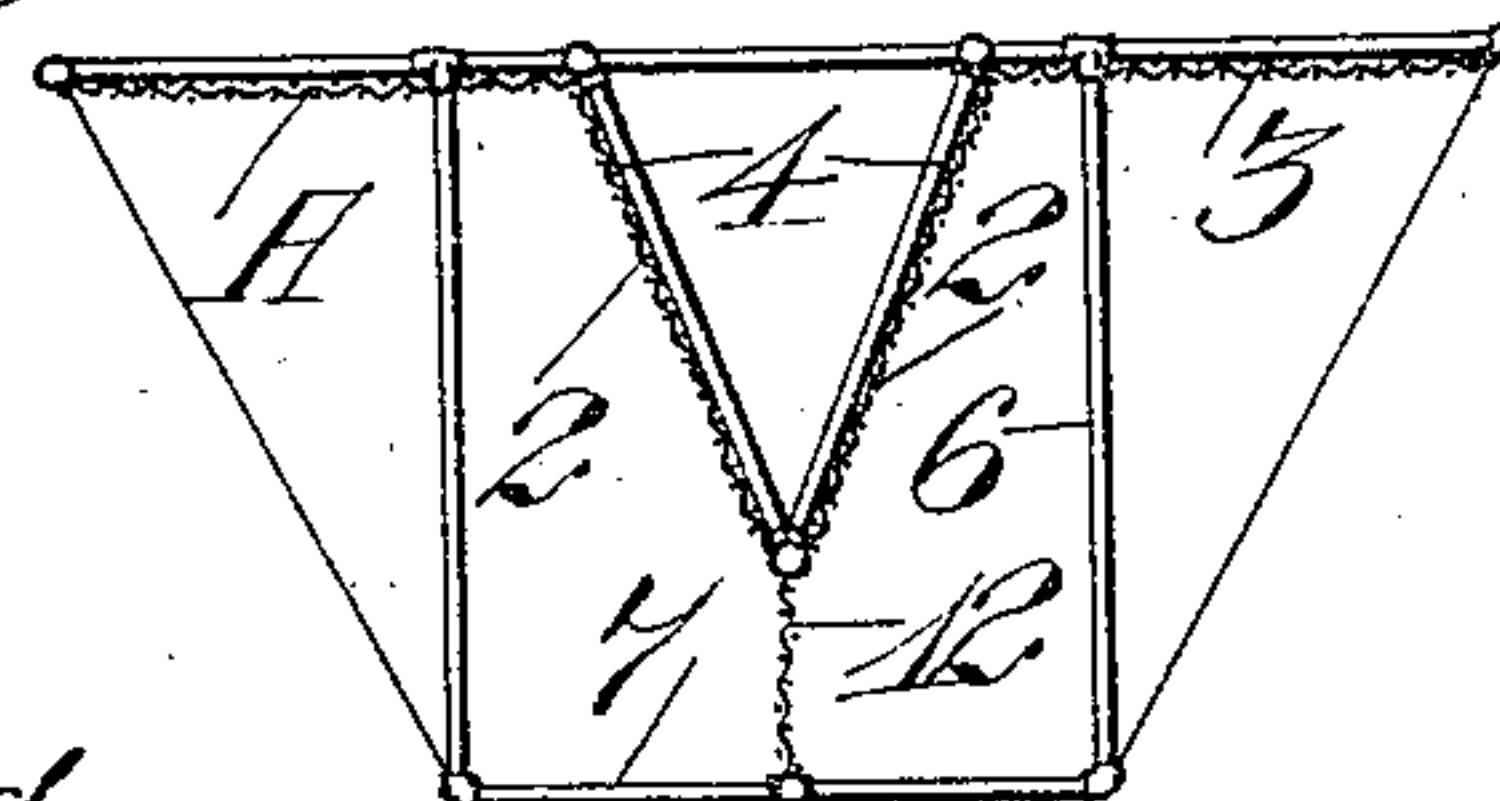
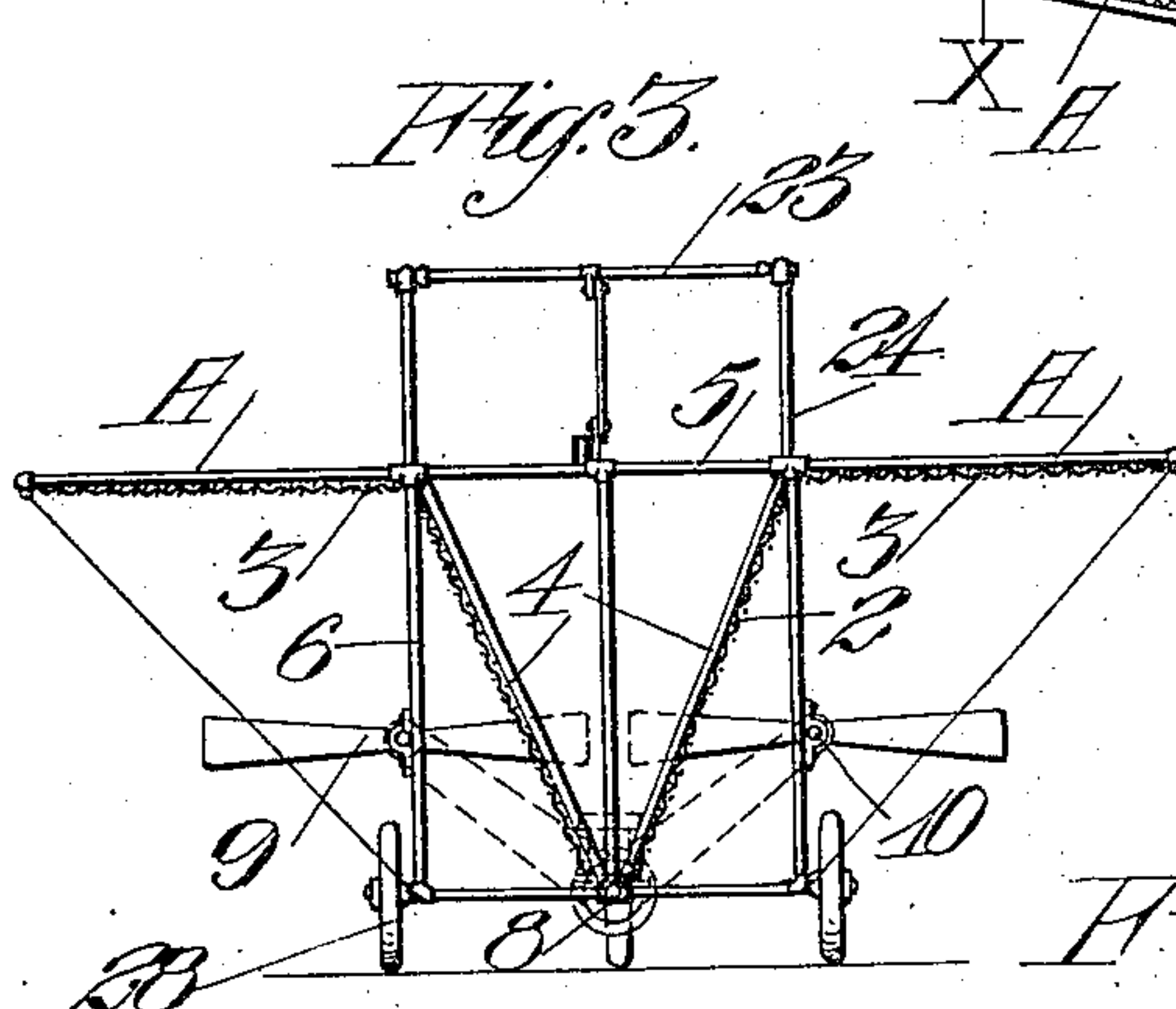
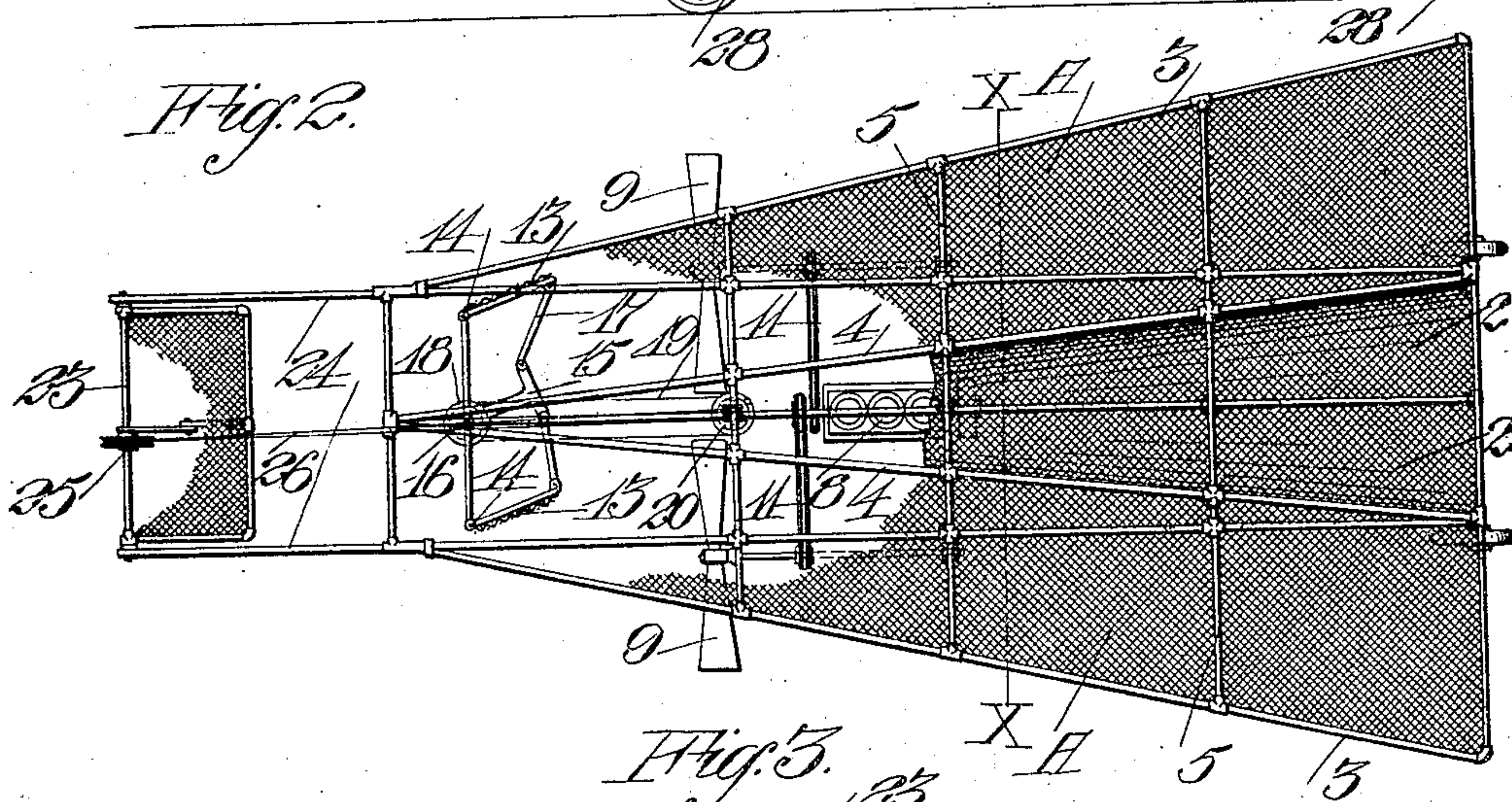
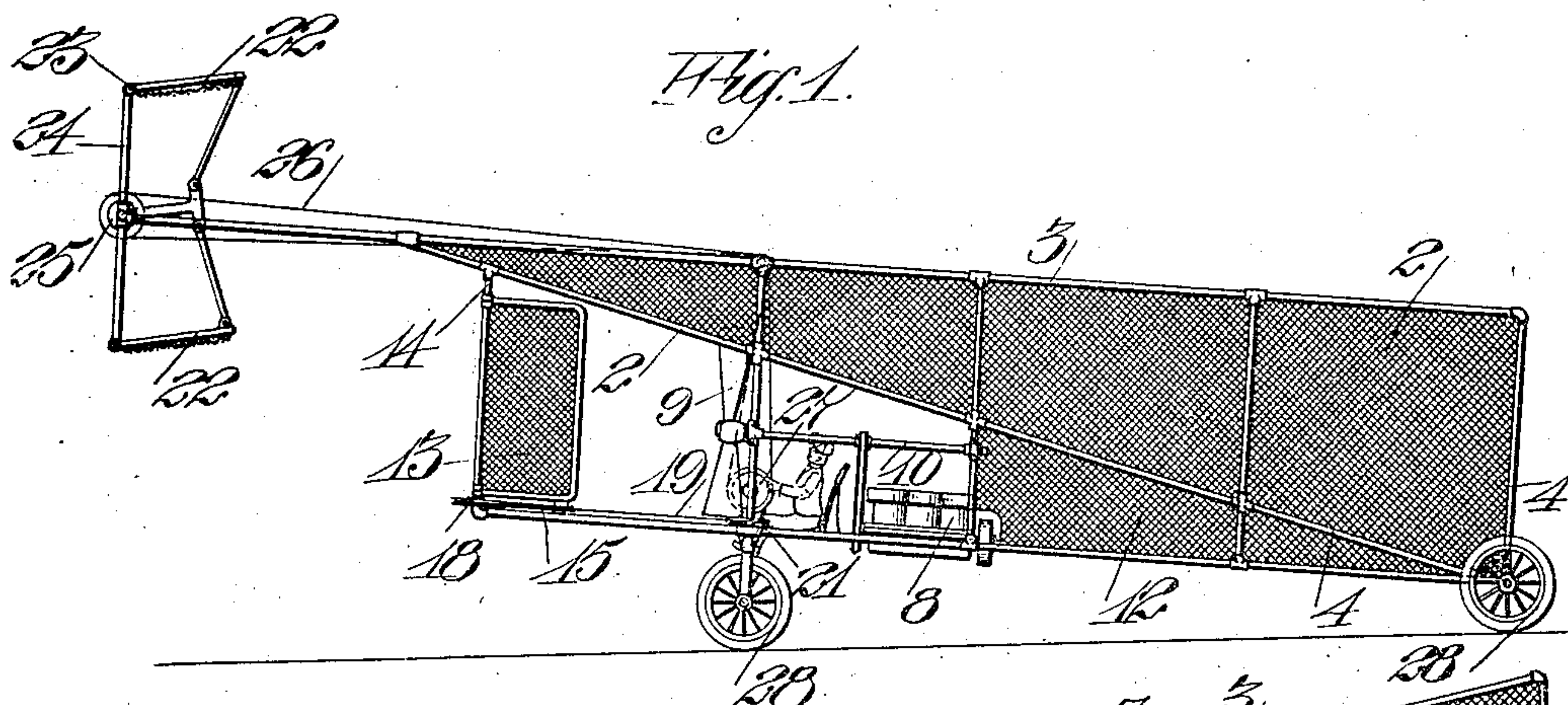


R. W. STEWART.
 MONOPLANE AEROPLANE.
 APPLICATION FILED MAY 6, 1909.

Patented Mar. 8, 1910.

951,154.



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UNITED STATES PATENT OFFICE.

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MONOPLANE AEROPLANE.

951,154.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed May 6, 1909. Serial No. 494,234.

To all whom it may concern:

Be it known that I, ROBERT W. STEWART, a citizen of the United States, residing at East Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Monoplane Aeroplanes, of which the following is a specification.

My invention relates to flying-machines of the aeroplane type.

The object of my invention is to construct an aeroplane having a maximum degree of stability, which will be capable of being maintained at a uniform elevation above the earth while the main plane is in horizontal position, or nearly so, and which aeroplane will offer a minimum of resistance to the air.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the invention. Fig. 2 is a plan of the same with the top partly broken away to show the underneath workings. Fig. 3 is an end view of the apparatus. Fig. 4 is a section on X—X of Fig. 2.

As shown in Fig. 2, the aeroplane is essentially trapezoidal in outline, being widest at the rear and tapering to the front. This trapezoidal body is made up of two lateral wings A of trapezoidal form, brought together at the front and expanded toward the rear; the space between these two wings being occupied by a trough-like, V-shaped, hollow, pyramidal breast 2. This pyramidal breast is in cross-section that of an equilateral triangle; its greatest cross-sectional area being at the rear, and tapering from the rear to the front of the aeroplane, where its apex joins the front meeting edges of the wings A. This pyramidal breast with its open trough-like character constitutes the main feature of the present invention, since it contains great balancing as well as lifting properties, and forms a truss for the strengthening of the whole structure.

The wings and breast are made of tough fabric stretched over a suitable framework 3 of connecting rods and braces. The breast portion 2 is stretched over its triangular inclined frames 4, and the whole being suit-

ably braced across the top, as shown at 5, 55 and down the sides and across the bottom, as at 6 and 7. This metal framework made out of light, staunch metal tubing constitutes in itself a rectangular-shaped skeleton box, on the lower part of which frame are supported the motors 8 for driving the propellers 9, and the seat for the operator by whom the flight of the machine is controlled. The propellers, of which there may be any suitable number, are preferably arranged at the sides of the machine, as shown, and below the lateral wings A, the propellers being carried by their shafts 10, which latter receive motion from the engine through suitable connections, represented at 11.

Back of the engine and extending downward to the bottom of the portion 7 of the metal frame is a keel or center-board or fin portion 12 of fabric which is triangular in shape and extending beneath the breast 2 and in line with the lower edge of the latter. This fabric center-board portion 12 performs the functions of the usual keel or center-board of a boat to prevent side slip, and also to assist in giving stability to the structure.

The sidewise steering of the machine is done from the rudders 13 arranged in front of the driver, and composed of fabric mounted on suitable frames turning on vertical standards 14. The movement of these rudders in unison is effected by suitable means, as a T-lever 15 having a central arm fulcrumed at 16 between the rudders 13; the lateral arms of the T 15 being connected by links 17 with the rear outer ends of the rudders. A drum 18 is fixed in the pivotal end of the lever 15 and concentric with the pivot 16, and the turning of the drum to oscillate the rudders is accomplished from a point convenient to the driver by suitable means, as the tiller cords 19 passing around the drum 18 and around a tiller-wheel 20 which may have a handle 21 to enable the operator to turn it.

The ascensional and descensional movements of the aeroplane are regulated by one or more planes 22 mounted on horizontal shafts 23 on a rigid framework 24 extending forward of the trapezoidal frame of the machine. These planes or wings 22 are of fabric and are worked in unison from the steersman's seat by connections 25 and 26

with the steering-wheel 27, similar to the steering gear just described in connection with the tillers 13.

A 60° angle for the trough-like breast 2 of the aeroplane is most efficient, for several reasons. If the aeroplane is sitting horizontal in the air, the pressure on the sides of the trough-like breast will be equal, no matter what angle is used. If the aeroplane is tilted to the right, the pressure on the left side will decrease until that side is perpendicular, at which position the pressure will be zero, and the pressure on the right side will increase as its angle increases with the perpendicular. The resultant pressure may be represented by a lever of the second class; the power is the pressure on the right hand side of the breast, the fulcrum is the apex of the triangle, and the weight is the pressure on the left hand side of the breast. If an angle greater than 60° should be used, while I would obtain a greater resultant leverage, the main frame of the aeroplane, however, would have to tilt through an arc in excess of 30° to attain this leverage, and when an aeroplane is tilted to more than an angle of 30° it is in grave danger of completing the arc to 90° and crashing to the ground. Another important thing in regard to the breast is that it is open on top from front to back, and therefore the aeroplane presents only a thin edge throughout its length to the resistance of the air, and consequently the apparatus can move through the air with almost unretarded motion, because there will be practically no vacuum behind the machine.

The trapezoidal shape of the aeroplane is also an important feature, because the substantial breadth at front is necessary in order not to render the apparatus too sensitive or inclined to be unmanageable, as would be the case if the front of the machine was brought to a point like a dart.

The apparatus may be provided with wheels, as represented at 28, to permit of an easy landing of the machine, or to assist in its starting.

Another important feature is the position of the propellers forward of the center of the machine, and in such position as to form a pivot or balance for the machine, making it easier to handle. This feature, taken in conjunction with the front steering rudders, gives the operator a more perfect control of a long, narrow, tapering plane, such as here represented.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. An aeroplane having a body portion approximately trapezoidal in outline being widest at the rear and narrowest at the front, said trapezoidal portion being bisected by a trough-like breast open on top

from end to end, having its top edges tapering from the rear to the front of the machine and having its bottom tapering from front to rear with its apex joining the front edges of the body portion.

2. An aeroplane having a body portion comprising two lateral wings of trapezoidal form, said wings being widest at the rear and narrowest at the front, and an intermediate breast portion of trough-like form open from end to end on top, said breast portion widening from front to rear in both horizontal and vertical planes and presenting a substantially equilateral triangle in cross section.

3. An aeroplane comprising a body portion composed of lateral wings of trapezoidal form, widened toward the rear, an intermediate trough-like, V-shaped, hollow, pyramidal breast, a center-board portion along the lower edge of said breast, and a steering rudder at the forward end of the breast.

4. An aerial machine comprising an aeroplane body portion substantially trapezoidal in outline, having its wider parallel side at the back, the central portion of the aeroplane being dropped down in the form of a hollow, open, V-shaped trough, the wings formed by the aeroplane at the sides of said trough being essentially in the form of trapezoids meeting at the forward apex end of the trough, and a central depending fin or center-board portion along the lower edge of said breast.

5. An aerial machine comprising an aeroplane body portion substantially trapezoidal in outline, having its wider parallel side at the back, the central portion of the aeroplane being dropped down in the form of a hollow, open, V-shaped trough, the wings formed by the aeroplane at the sides of said trough being essentially in the form of trapezoids meeting at the forward apex end of the trough, and a central depending fin or center-board portion along the lower edge of said breast, said device provided with propellers and means for operating the same, and steering mechanism for controlling the direction of movement of the aeroplane.

6. An aeroplane having a body portion approximately trapezoidal in outline, being widest at the rear and narrowest at the front, said trapezoidal portion being bisected by a pyramidal trough-like breast open from end to end on top, and said aeroplane having a vertical rudder at the front and a horizontal rudder in advance of the aeroplane and carried thereby, with means for operating said rudders.

7. An aeroplane having a body portion approximately trapezoidal in outline, being widest at the rear and narrowest at the front, said trapezoidal portion being bi-

sected by a pyramidal trough-like breast open from end to end on top, said aeroplane having a vertical rudder at the front and a horizontal rudder in advance of the
5 aeroplane and carried thereby, with means for operating said rudders, and propellers carried by and situated forward of the center of the machine.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT W. STEWART.

Witnesses:

SAMUEL C. BENNETTS,
W. B. KENNEDY.