

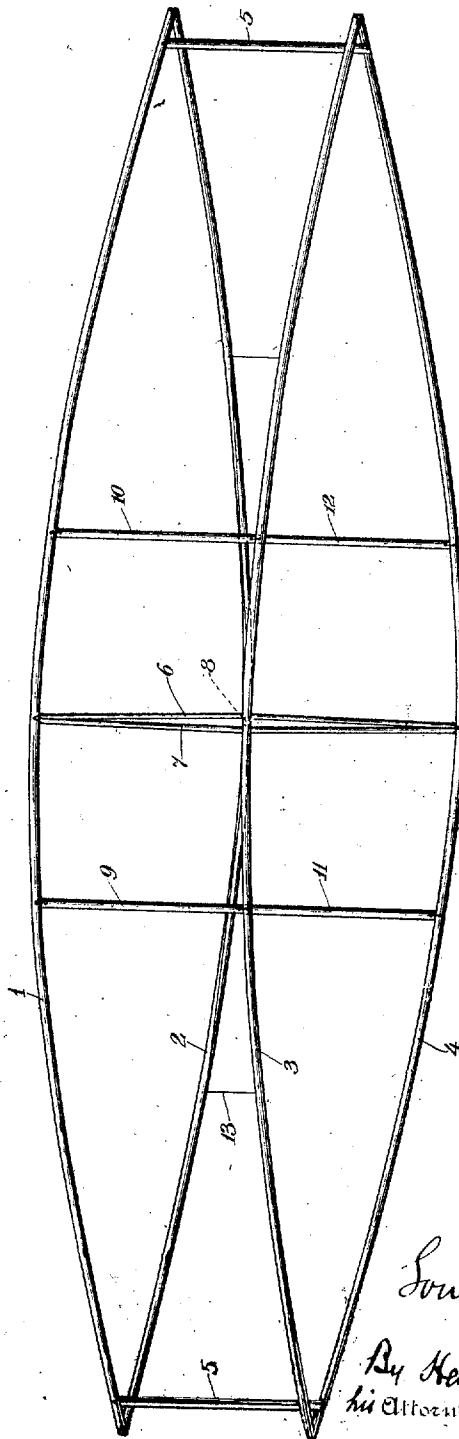
965,792.

L. R. ADAMS.
AEROPLANE.
APPLICATION FILED FEB. 5, 1909.

Patented July 26, 1910.

6 SHEETS—SHEET 1.

Fig. 1

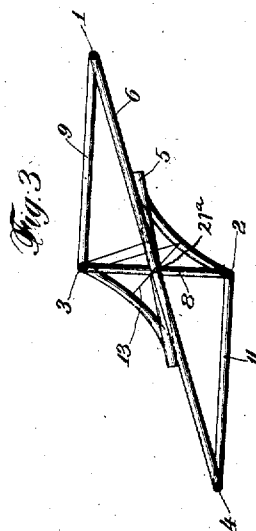
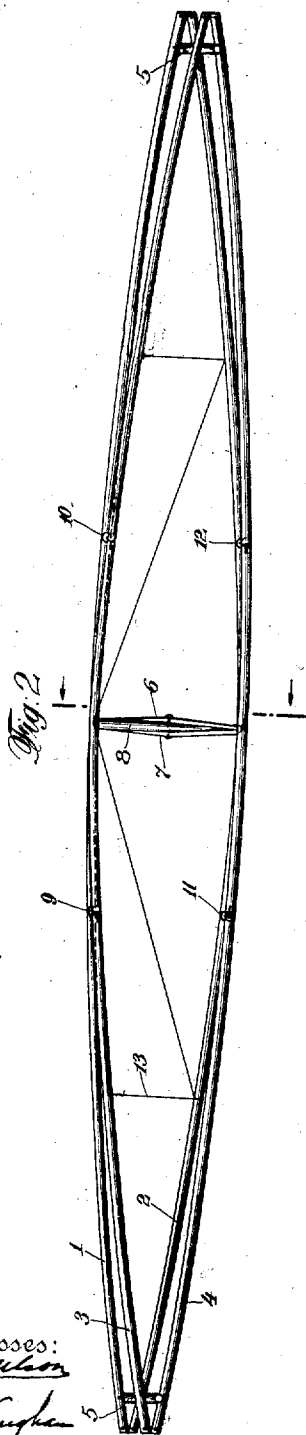


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5 SHEETS—SHEET 2.

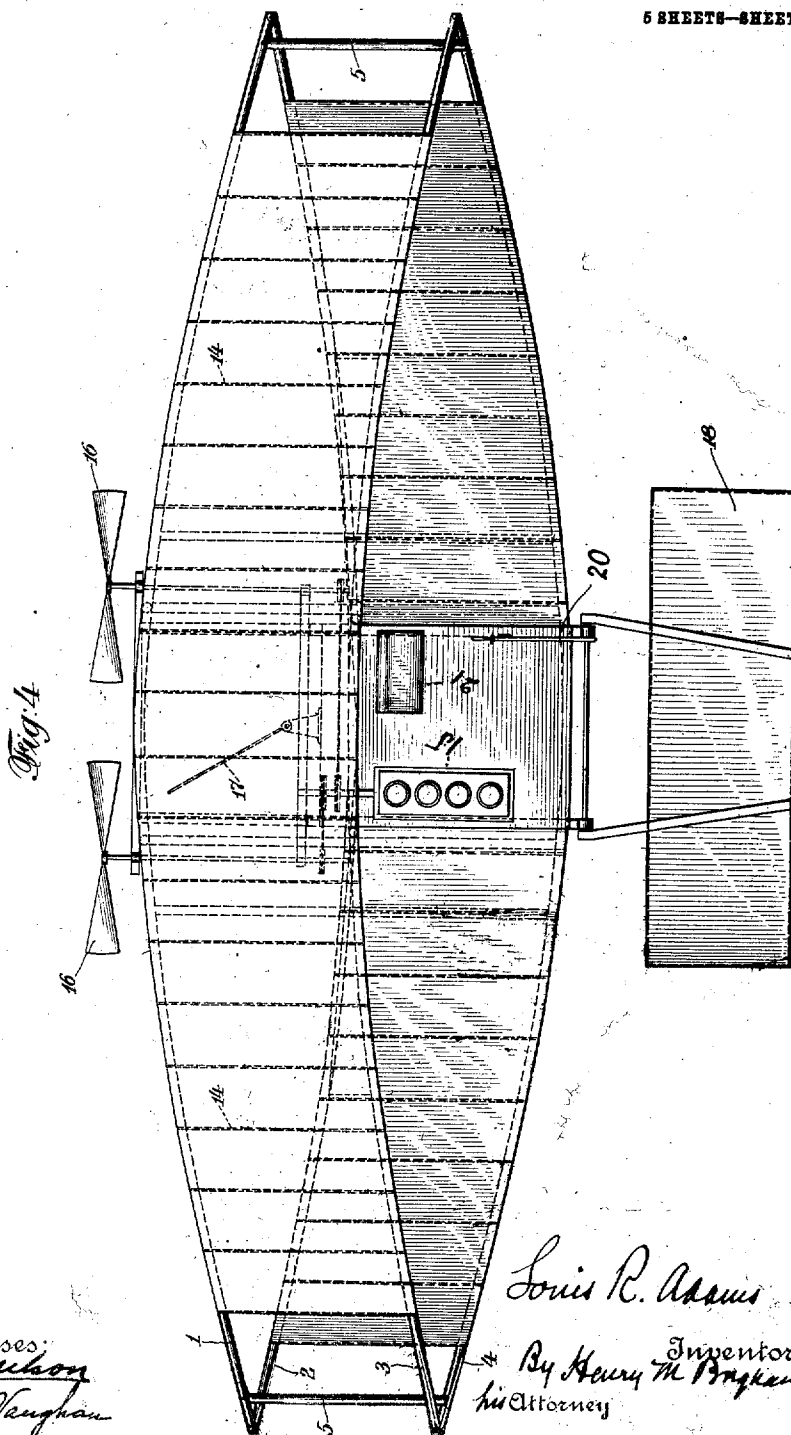


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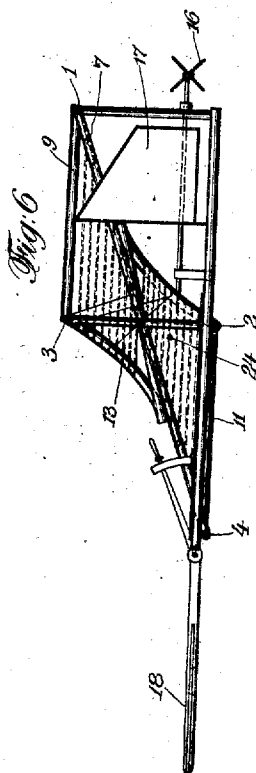
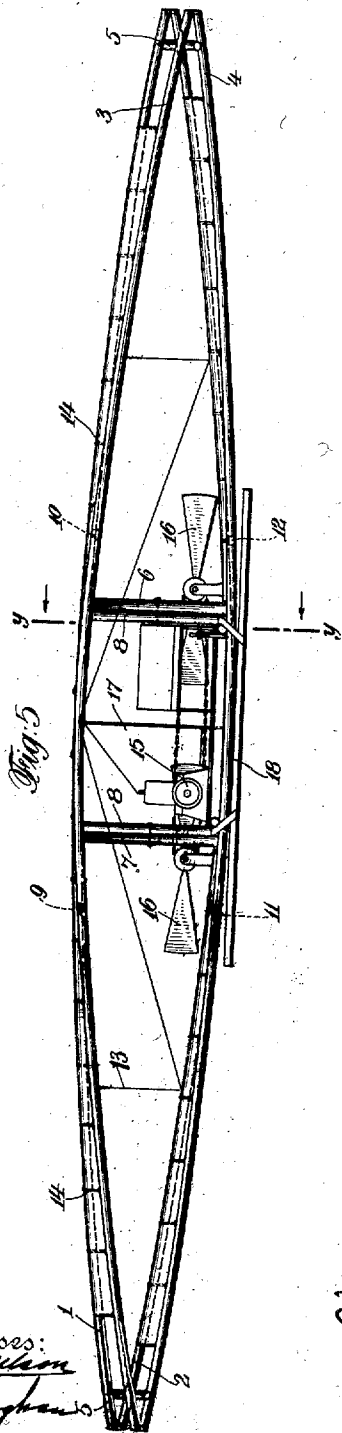
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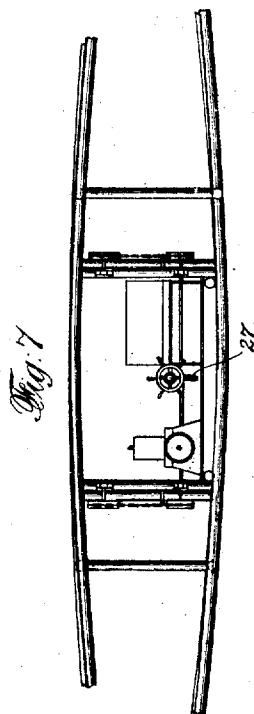
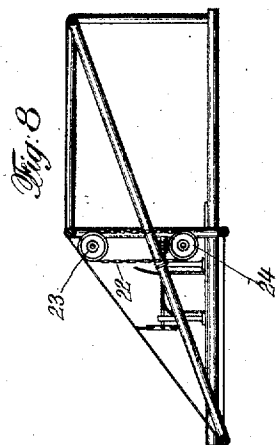
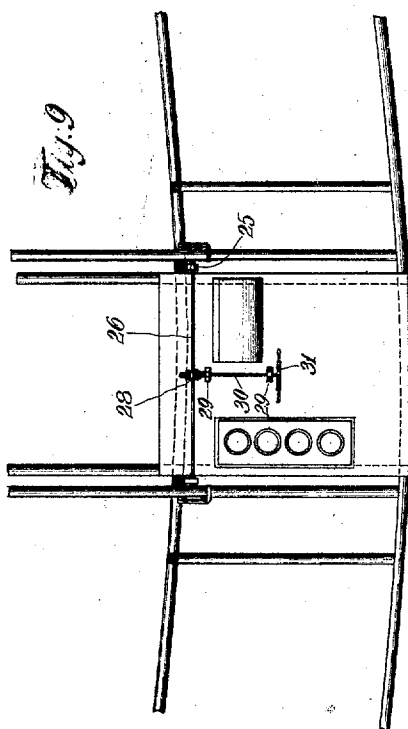
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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AEROPLANE.

965,792.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed February 5, 1909. Serial No. 476,308.

To all whom it may concern:

Be it known that I, LOUIS R. ADAMS, a citizen of the United States, and residing in the borough of Manhattan, city, county, and State of New York, have invented a new and useful Improvement in Aeroplanes, of which the following is a specification.

My invention relates to improvements in aeroplanes and frames therefor, and the objects of my invention are to produce a strong, simple and economical frame which will be light and rigid, the front edge of the lower plane being somewhat in advance of the front edge of the upper plane.

In carrying out the objects of the invention generally stated above, it will of course be understood that the essential features thereof are susceptible to structural change and arrangement of parts without departing from the spirit or scope of the invention, but a preferred and practical embodiment of the same is shown in the accompanying drawings, wherein—

Figure 1 is a plan view of my improved frame. Fig. 2 is a front view or elevation of my improved frame. Fig. 3 is a sectional view on the line *x x*, Fig. 2. Fig. 4 is a plan view showing the supporting planes stretched over the frame and the ribs in the dotted lines. Fig. 5 is a front view or elevation of my improved aeroplane. Fig. 6 is a sectional view on the line *y y* of Fig. 5. Fig. 7 is an elevation, partly broken away, showing the mechanism for warping the rear plane. Fig. 8 is a sectional view, showing the mechanism for warping the rear plane. Fig. 9 is a plan view, partly in section and partly broken away, showing details of the mechanism.

In the drawings and specification similar numerals designate similar parts.

The frame of my improved aeroplane consists of four principal members 1, 2, 3 and 4. The ends of the members 1 and 2 are secured together by any suitable means, forming what I designate a group, as are also the ends of the members 3 and 4, forming a second group. The respective ends of the group composed of the members 1 and 2 are secured to the respective ends of the group composed of the members 3 and 4 by tie rods 5—5, and the outer members 1 and 4 of each group are forced apart and maintained in this position by spreader rods 6 and 7, and the members 2 and 3 of each group are

forced apart by the spreader rod 8, which is much shorter than the spreader rods 6 and 7.

In order to give the frame rigidity and to space the corresponding members 1 and 2, and 2 and 4, I secure the members 1 and 3 together by the tie rods 9 and 10, and the members 2 and 4 by the tie rods 11 and 12. I may also give the structure additional rigidity and strength by means of guy wires, as, for instance, the guy wire 13, which is secured to the member 2 about midway between the end thereof and the central point of such member, from which point it passes and is secured to the member 3 about midway between the end and the central point thereof; thence it is passed and secured to the central portion of the member 2; thence it passes and is secured to the member 3 at a point about midway between the center and the opposite end thereof; thence it passes and is secured to the member 2 at a point midway between the center and the opposite end thereof. This guy wire when drawn taut gives much additional rigidity and strength to the frame. It is understood that additional tie rods, guy wires, or cords and spreader rods may be used for further stiffening or strengthening the frame, should it be found necessary or desirable so to do.

As shown in Fig. 4, supporting planes consisting of silk, rubber cloth or other suitable material are secured to the main members of the frame, the members 1 and 3 serving as a frame for the upper plane and the members 2 and 4 for the lower plane. As shown in dotted lines in Fig. 4, cross ribs may be introduced into the material used to cover the frame or may be secured to the principal members of the frame.

By constructing my frame as described and shown, I am able to obtain two plane surfaces, the lower one of which curves toward the front and the upper one toward the rear, so that the central portion of the lower surface is practically all in advance of the central portion of the upper surface, while the ends of such planes lie substantially one above the other. The supporting planes may be continued to the ends of the frame or may be terminated at any point found desirable.

I have also shown in Fig. 4 a platform mounted on the members 2 and 4 of the frame, which supports a motor 15 which drives propellers 16—16 for the purpose of

propelling the aeroplane. For the purpose of controlling and changing the direction of flight to right or left, I have provided a rudder 17 and for the purpose of causing the aeroplane to rise or fall in its flight I have provided a horizontal rudder 18 which may be elevated or lowered by means of the lever 20. The seat for the operator I have designated by the numeral 21.

By the construction shown the frame for the lower plane is composed of the principal members 2 and 4, or one from each of the groups before mentioned. The frame for the upper plane is composed of the members 1 and 3, being also one member from each of the groups before mentioned. As these principal members 1, 2, 3 and 4 are under high tension produced by the spreader rods 6, 7 and 8 and the tie rods 5-5, the frame is exceedingly rigid, and any strain upon any one of the members is distributed among all the other principal members through the spreader rods, tie rods, spacing rods and guy wires, so that the planes have very little tendency to deviate from their normal shape when subjected to strains. I have also found that, by placing the central portion of the lower plane in advance of the central portion of the upper plane, additional stability is given to my aeroplane in flight, because, when the aeroplane tends to rise upward, the upper plane is partially blanketed by the lower plane, in effect reducing the supporting surfaces and causing the structure to right itself automatically. When the structure tends to dive, the upper plane is then more freely exposed to the air currents, causing the structure to again right itself automatically.

By the structure described, I obtain a frame which is exceedingly rigid, which it is difficult to distort from its true form and in which the strains put upon any one of the main members are distributed among all of the other main members; which is very light, contains but few parts, which is particularly rigid at the outer ends thereof, and in which the main members which form the front edge of the supporting planes are under high tension.

As shown in the drawings, the spreader rods 6 and 7 pass on either side of the spreader rod 8, and are secured thereto by a bolt 21*. I have found, however, that I can dispense with this bolt and also with the rudder 18, and cause my aeroplane to rise or fall in its flight by shifting the spreader rods 6 and 7 up or down upon the rod 8, which causes the rear upper plane to act as a rudder and serve practically the same purpose as the rudder 18. This movement of the rods 6 and 7 upon the rod 8 I can produce by means of the mechanism shown in Figs. 7, 8, and 9, which consists of an end-

less chain 22 attached to the spreader rods 6 and 7 and passing over the pulley 23, and a sprocket wheel 24, both supported from the spreader rod 8. The sprocket wheel 24 is rotated by means of a shaft 26, which is supported in the bearings 25, by means of a gear 27, mounted near the center of said shaft, through a worm 28, attached to a shaft 30 mounted in the bearings 29-29, on the opposite end of which is a hand wheel 31, by rotating which the operator operates the mechanism. As the lower plane composed of the members 4 and 2 carries the engine, propellers and operator, and is very rigidly braced at the point of their support, the inertia of this plane is far greater than the inertia of the upper plane, and it is likewise more rigid, with the result that when the spreader rods 6 and 7 are moved upward on the rod 8 the rear end of the upper plane is tilted upward; and when they are moved downward, the rear end of the upper plane is tilted downward, causing the upper plane to perform the functions of a rudder. When the upper plane is used as a rudder it is desirable to interpose additional braces between the members 3 and 4, and 2 and 3, as shown in Fig. 5. These braces disposed as shown in Fig. 5 tend to maintain the members 2, 3 and 4 in definite spaced relation to each other, and to throw all the movement caused by the shifting of the spacing rods 6 and 7 upon the frame member 1 which forms the rear member of the frame of the upper plane.

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

1. An aeroplane provided with two planes, the central portion of the lower plane being in advance of the central portion of the upper plane and the ends of such planes lying substantially one above the other.

2. A frame for aeroplanes consisting of four principal members, the ends of which are secured together in groups of two; tie rods adapted to space apart the ends of such groups, and spreader rods adapted to force the members of one group away from the members of the other group and subject them to constant tension.

3. A frame for aeroplanes consisting of four principal members, the ends of which are secured together in groups of two; tie rods adapted to space apart the ends of such groups, and spreader rods adapted to force each member of each group away from the corresponding member of the other group and subject them to constant tension.

4. A frame for aeroplanes consisting of four principal members, the ends of which are secured together in groups of two; tie rods adapted to prevent the ends of such

groups from separating, and spreader rods adapted to force corresponding members of such groups away from each other.

5. A frame for aeroplanes consisting of four principal members, the ends of which are secured together in groups of two; tie rods adapted to space apart the ends of such groups, and spreader rods adapted to force one member of each group away from a member of the other group; one of such spreader rods being longer than the other.

6. A frame for aeroplanes consisting of four principal members, the ends of which are secured together in groups of two; spreader rods adapted to maintain such members in such spaced relation to each other that two members, one from each group, are adapted to constitute a frame for each of the two planes.

7. A frame for aeroplanes consisting of four principal members, the ends of which are secured together in groups of two, means for spacing apart the ends of such groups,

and means for forcing the members of one group away from the members of the other group and subjecting them to constant tension.

8. An aeroplane having two planes, one above the other, the central portion of the lower plane being in advance of the central portion of the upper plane, and means for depressing or elevating the rear edge of the upper plane.

9. An aeroplane provided with two planes, one above the other, and means for depressing or elevating the longitudinal edge of one plane with reference to the other plane.

10. An aeroplane provided with two planes, the central portion of one plane being in advance of the central portion of the other plane and the ends of such planes lying substantially one above the other.

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Witnesses:

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