G. ORTGIER.

AEROPLANE.

APPLICATION FILED DEC. 10, 1920.

1,396,459. Patented Nov. 8, 1921.

3 SHEETS—SHEET 1.

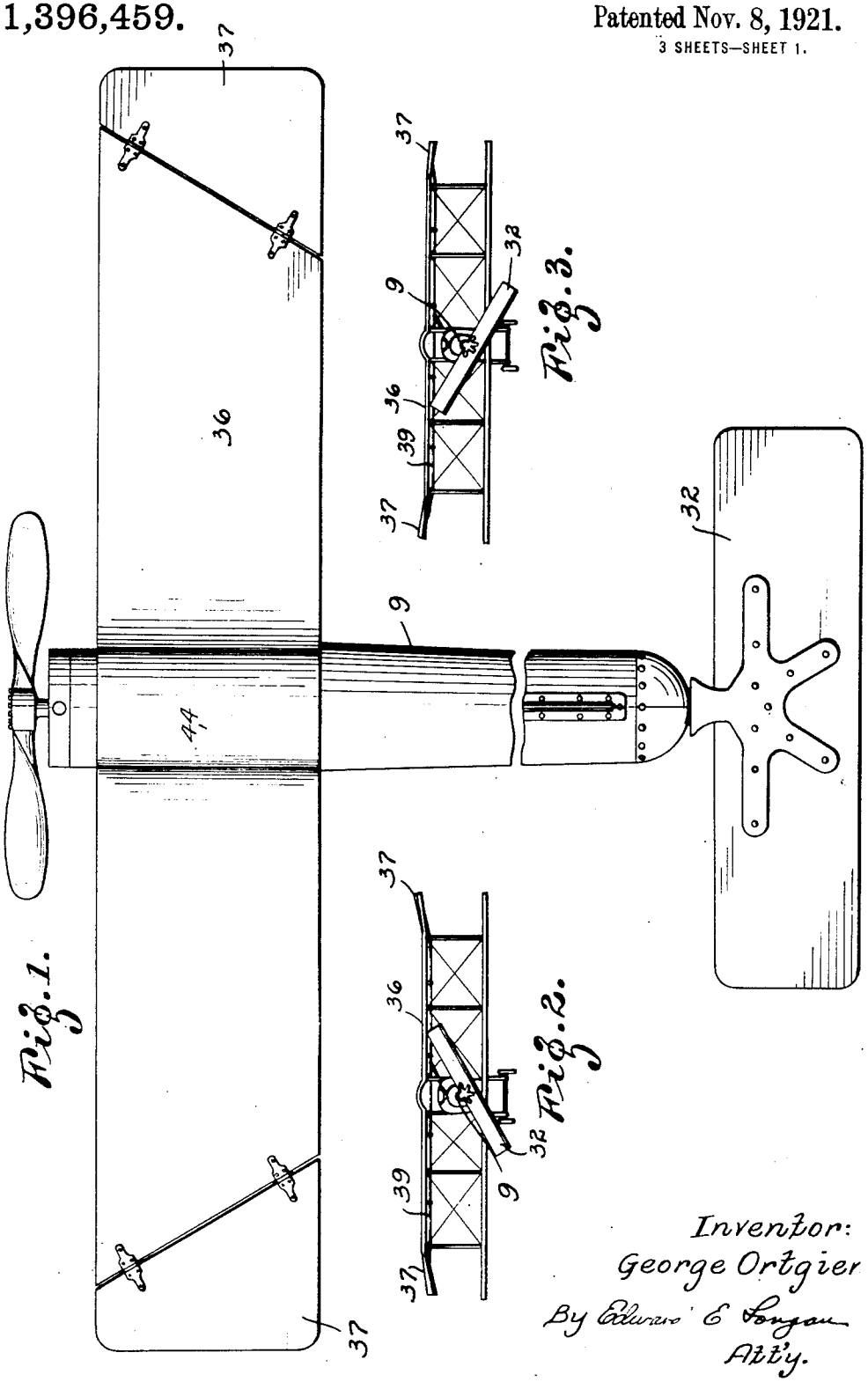

Fig. 1.

Fig. 3.

Fig. 2.

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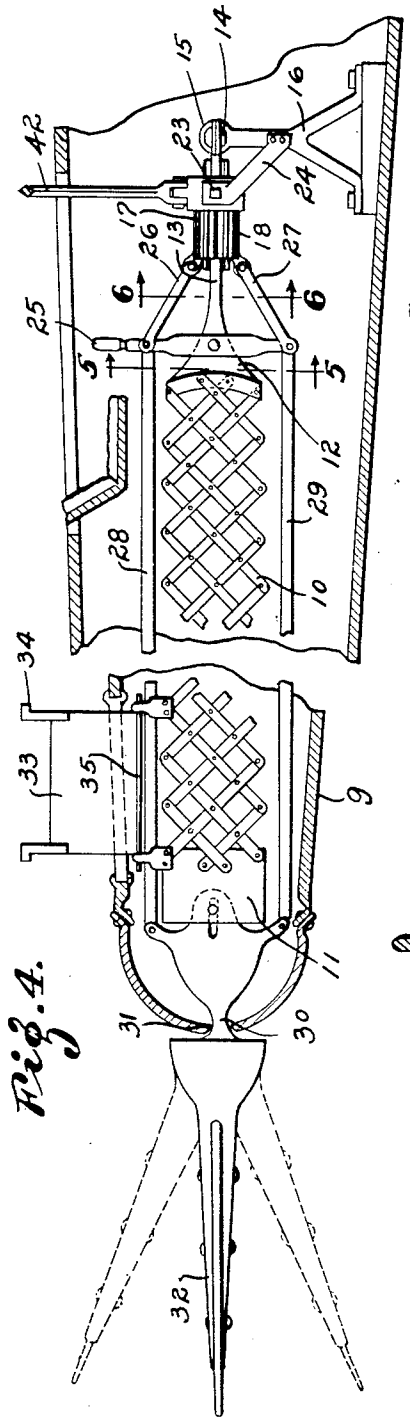

Fig. 4.

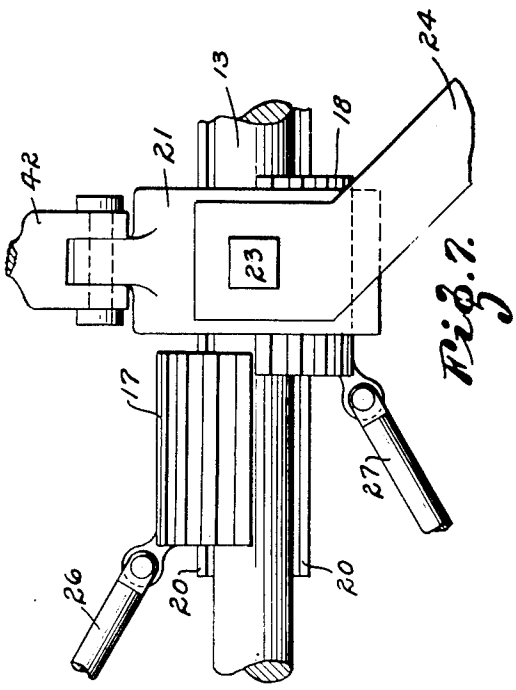

Fig. 7.

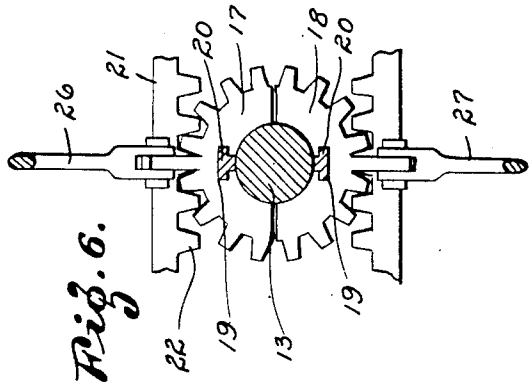

Fig. 6.

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3 SHEETS—SHEET 3.

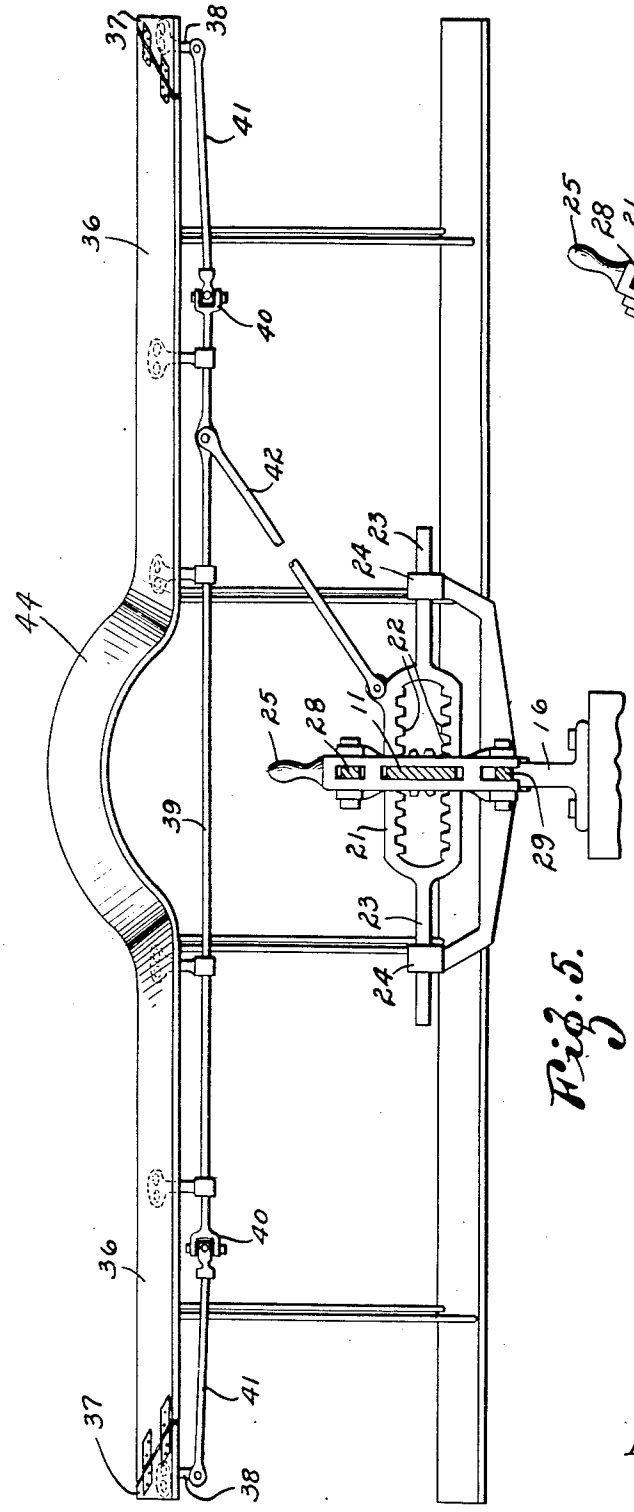

Fig. 5.

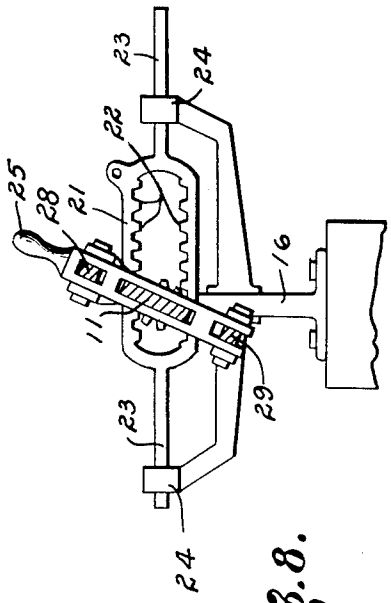

Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE ORTGIER, OF EAST ST. LOUIS, ILLINOIS.

AEROPLANE.

1,396,459. Specification of Letters Patent. Patented Nov. 8, 1921.

Application filed December 10, 1920. Serial No. 429,618.

To all whom it may concern:

Be it known that I, GEORGE ORTGIER, a citizen of the United States, and resident of the city of East St. Louis, county of St. Clair, and State of Illinois, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification, containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in aeroplanes, and has for its primary object the construction of an aeroplane which is provided with a steering plane on its rear end and with ailerons, both of which may be controlled or adjusted to guide the plane in any desired direction.

This invention is an improvement on my previous application filed June 1, 1920, Serial Number 385,588, allowed October 5, 1920.

In the drawings—

Figure 1 is a top plan view of my improved aeroplane;

Fig. 2 is an end elevation, showing the adjustment in descending toward the left;

Fig. 3 is a similar view, showing the plane adjusted in descending toward the right;

Fig. 4 is a vertical-longitudinal section of the rear portion of the aeroplane with parts broken away;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 4, with parts broken away, looking in the direction of the arrows;

Fig. 6 is a section taken on the line 6—6 of Fig. 4 with parts broken away, looking in the direction of the arrows;

Fig. 7 is a fragmentary side elevation of the means for operating the ailerons; and

Fig. 8 is a section taken on the line 6—6 of Fig. 4 with the operating handle adjusted toward the right.

Referring by numerals to the accompanying drawings:

9 indicates the rear body portion of the aeroplane and within which is a skeleton or latticed member 10, and secured to the rear end of the latticed member 10 is a head 11, and secured to the front end of the latticed member 10 is a head 12, the head 12 carrying the shaft 13, and on the head 13 is a ball 14 mounted in the bearing 15. The shaft 13 and its contiguous parts are supported by a frame 16.

Secured to the shaft 13 is a sliding gear, composed of two portions 17 and 18. Each of the sections 17 and 18 are provided with a T-shaped key-way 19, adapted to receive a key-shaped rib or key 20, formed on or carried by the shaft, said construction being illustrated in Fig. 6. These members 17 and 18 are independently movable and both rotate with the shaft 13.

21 indicates a yoke provided with teeth 22 on its upper and lower portions, which are adapted to mesh with the teeth formed on the members 17 and 18. The yoke 21 is provided with extensions 23 which are mounted in the bearings 24, the bearings 24 being carried by the frame 16. The yoke 21 is adapted to move laterally by the rotation of the shaft 13 and the gear members 17 and 18.

Pivotally secured to the head 12 is an operating handle 25, which may be moved forwardly and rearwardly and by means of which the skeleton member 10 and the shaft 13 may be rotated. The member 17 is pivotally connected to the handle 25 by means of a link 26 and the member 18 is pivotally connected to the operating handle 25 by means of a link 27.

As previously pointed out, the two members 17 and 18 are independently movable and move in opposite directions on the shaft 13 when the handle 25 is operated forwardly or rearwardly.

The head 11 is pivotally connected to the operating handle 25 by means of a link 28 and also is pivotally connected to the handle 25 by a link 29. The head 11 is provided with a reduced cylindrical portion 30 mounted in an opening 31 in the rear end of the casing, so that the head may rotate therein.

Secured to the head 11 is a guiding tail-plane 32. This tail-plane may be operated upwardly and downwardly by means of the handle 25 and may be also laterally adjustable.

By pushing the lever 25 forward the tail-plane is inclined upwardly and by moving it toward the right the tail-plane may be inclined toward the right.

Mounted in the rear body portion 9 is a

guiding-plane 33 provided with stops 34. This guiding-plane 33 is pivotally connected to the skeleton member 29 by means of a rod 35. When the skeleton member 29 is rotated by means of the operating handle 25 the guiding-plane 22 is depressed. When the plane is adjusted for straight horizontal flight, this guiding-plane is elevated as illustrated in Fig. 4, and acts merely as a steadying-plane.

Hingedly connected to the supporting plane 36 at each end thereof are ailerons 37 and secured to each aileron 37 is an arm 38. Mounted below the supporting-plane 36 is an operating rod 39 and secured to each end of the operating rod 39 by a universal connection 40 are links 41. The links 41 are pivotally secured to the arm 38. Pivotally secured to the operating-rod 39 is an arm 42, one end of which is pivotally secured to the yoke 21. It will thus be seen that by the lateral movement of the yoke through the gear members 17 and 18, the ailerons 37 may be adjusted as desired. In horizontal flight these ailerons are horizontal, and act as supporting surfaces.

When the plane 32 is merely tilted upwardly or downwardly by means of the operating handle 25, the ailerons are not adjusted but they are simultaneously adjusted when the tail-plane is first tilted and then laterally inclined, this lateral adjustment being effected, as previously pointed out, by the rotation of the skeleton member 10 and shaft 13 by means of the operating handle 25, the rotation of the said shaft imparting a lateral movement to the yoke 21, which lateral movement will impart the desired adjustment to the ailerons 37 through the operating rod 39.

It will be observed from Figs. 2, 3 and 5 that the supporting plane is arched at its center, as indicated by the numeral 44, so as to provide for about as much supporting area as that of the ailerons at the two ends of the plane.

It is also believed that this curved or arched portion will give a steadying action to the plane in horizontal flight, and will also act as a tendency to prevent side slipping.

The device as shown in Figs. 4 and 5 is for a horizontal flight and in which no turns are desired to be made. In order to operate the ailerons it is necessary to tilt the guiding plane 32 slightly, either upward or downward in order to release one of the half gears so that the guiding plane may be laterally inclined, by which operation the ailerons are simultaneously adjusted. By this operation it will be seen, that the plane in making a turn must be either slightly rising or descending as when the plane 32 is horizontal no lateral tilting can be imparted to the tail 32, nor to the ailerons.

Having fully described my invention, what I claim is:

1. An aeroplane comprising a body portion and a rear tubular portion, a partially-rotating rigid skeleton member located within the tubular portion having one end pivotally mounted therein, an operating lever pivotally connected thereto, a guiding plane mounted in the rear end of the rear portion and capable of being vertically and laterally tilted, a connection between said guiding plane and operating lever whereby the said guiding plane may be vertically and laterally tilted, simultaneously, adjustable ailerons, and a connection between said ailerons whereby when the guiding plane is laterally tilted the said ailerons will be simultaneously adjusted.

2. An aeroplane having a supporting plane, an aileron pivotally secured to each end thereof, a guiding plane capable of being upwardly and downwardly and laterally inclined, an operating lever, a connection between the operating lever and guiding plane whereby the guiding plane may be inclined upwardly and downwardly without adjusting the ailerons, and the ailerons may be adjusted simultaneously with the lateral inclination of the guiding plane.

3. An aeroplane having a supporting plane provided with an upwardly arched surface in its center, an aileron pivotally secured to each end thereof, a guiding plane capable of being upwardly and downwardly and laterally inclined, an operating lever, a connection between the operating lever and guiding plane whereby the guiding plane may be inclined upwardly and downwardly without adjusting the ailerons, and the ailerons may be adjusted simultaneously with the lateral inclination of the guiding plane.

4. An aeroplane having a supporting plane and a rear tubular body portion, a member rotatably mounted in said rear tubular portion, a guiding plane operable by said rotating member, a guiding plane capable of being vertically and laterally inclined mounted in the rear end of said tubular portion, a shaft carried by the rotating member located in said tubular portion, an aileron secured to each end of the supporting plane, a flexible shaft mounted below said supporting plane and connected to said ailerons and a connection between said flexible shaft and the shaft carried by the rotating member whereby when the latter shaft is rotated the ailerons may be operated simultaneously.

5. An aeroplane comprising a supporting plane and a rear tubular portion, a rotating member mounted in the rear tubular portion, a guiding plane connected to the rear end of said rotating member, a shaft carried by the forward end of said rotating mem-

ber, a split gear wheel nonrotatably mounted on said shaft, a yoke mounted on said split gear wheel, an aileron pivotally secured to each end of the supporting plane, a flexible shaft secured below said supporting plane and connected to said ailerons, a link connection between said shaft and yoke, an operating handle carried by the rotating member located in the rear tubular portion for adjusting the guiding plane and the ailerons.

In testimony whereof, I have signed my name to this specification.

GEORGE ORTGIER.