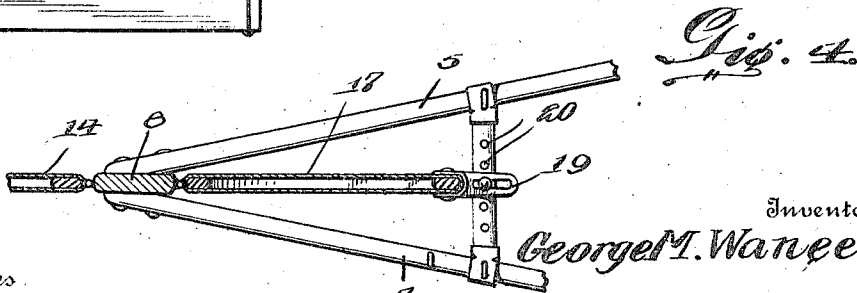
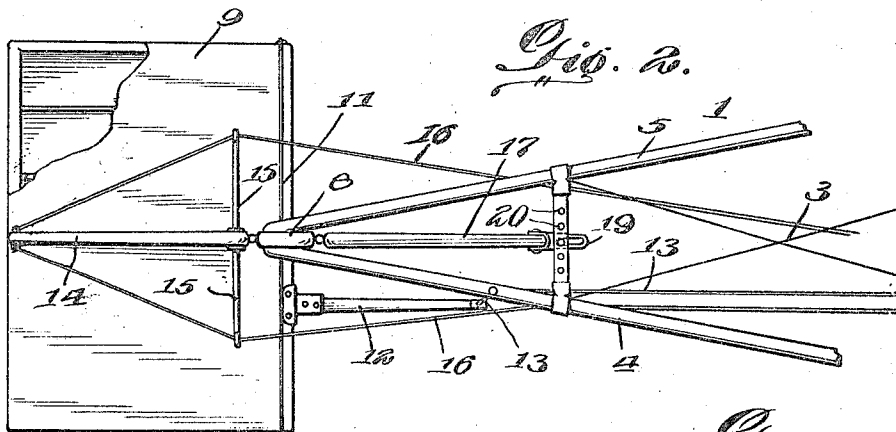
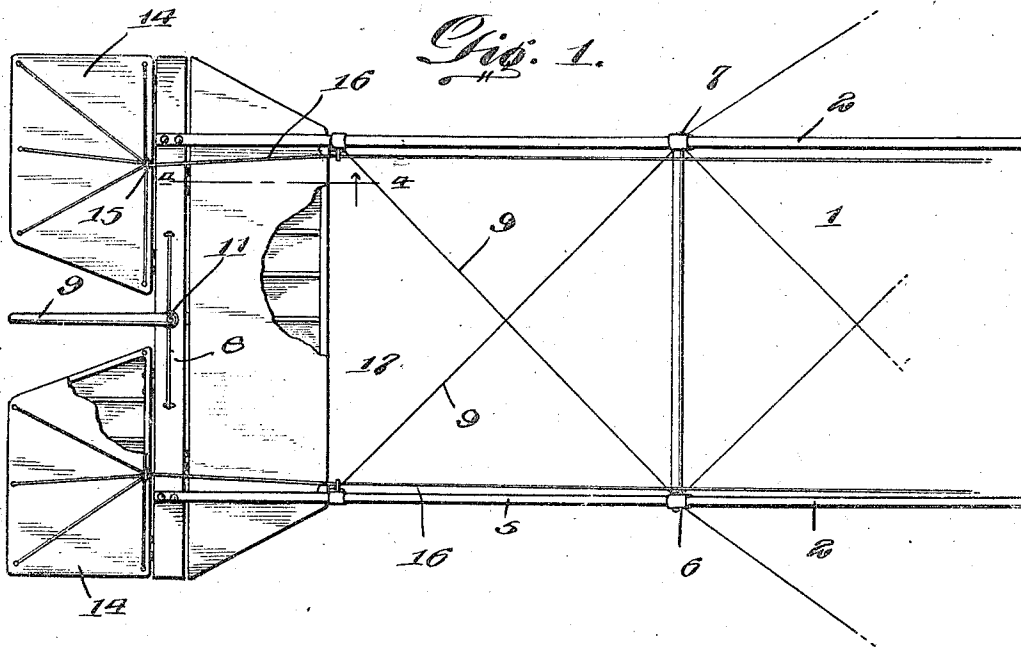


G. M. WANEE.
 TAIL CONSTRUCTION FOR FLYING MACHINES.
 APPLICATION FILED JAN. 17, 1916.

1,192,248.

Patented July 25, 1916.
 2 SHEETS—SHEET 1.



Witnesses

Fredrick L. Fox

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Victor J. Evans.

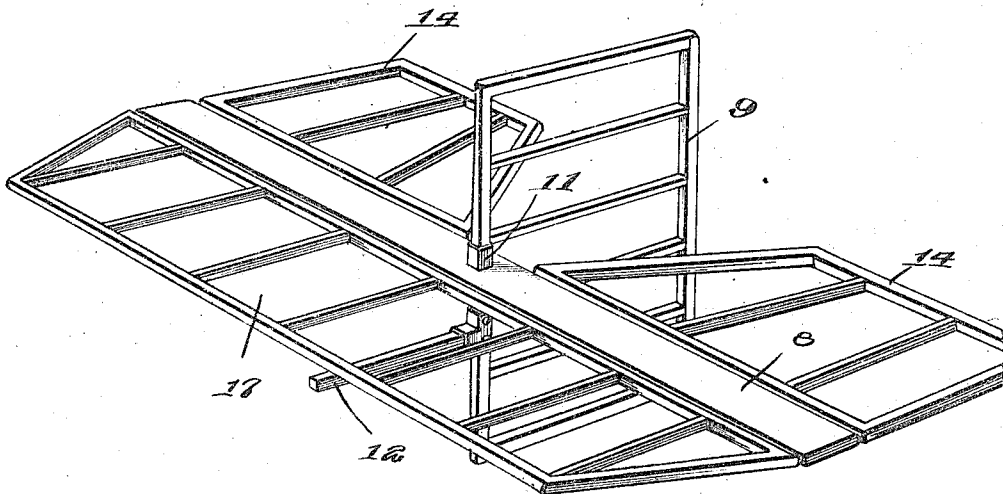
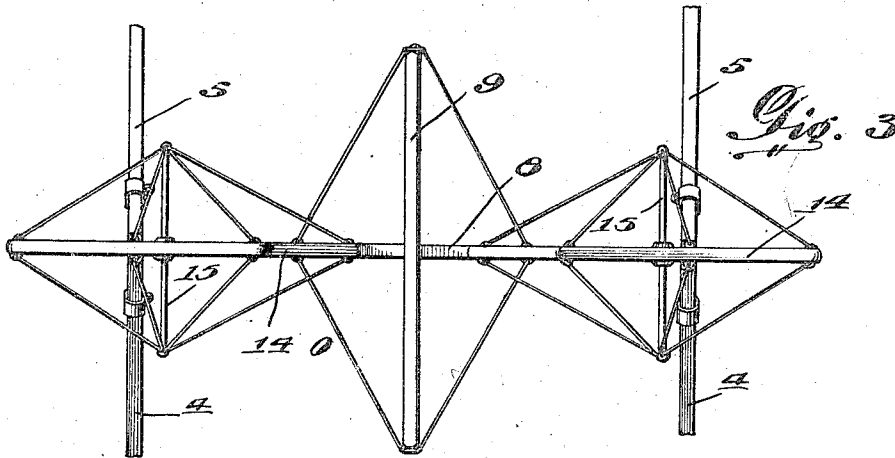
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UNITED STATES PATENT OFFICE.

GEORGE M. WANEE, OF OAKLAND, CALIFORNIA.

TAIL CONSTRUCTION FOR FLYING-MACHINES.

1,192,248.

Specification of Letters Patent.

Patented July 25, 1916.

Application filed January 17, 1916. Serial No. 72,597.

To all whom it may concern:

Be it known that I, GEORGE M. WANEE, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Tail Constructions for Flying-Machines, of which the following is a specification.

This invention relates to improvements in flying machines, particularly of the general class disclosed in my prior Patent No. 1,172,182, and has for its object to provide an empennage or tail frame structure for flying machines of the aeroplane type, and especially of the character shown in my application aforesaid, whereby a weight supporting and balancing tail of superior strength and general efficiency is produced.

A further object of the invention is to provide a tail frame structure embodying a novel arrangement of horizontal and vertical rudders and a weight supporting tail plane, which is adjustable to different angles of incidence, together with novel means for mounting said rudders and plane, by which maximum strength of construction and efficiency of action are obtained.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings in which:—

Figure 1 is a top plan view of a tail frame structure for flying machines embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a rear elevation. Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 1. Fig. 5 is a perspective view of the rear portion of the framework and parts carried thereby with the fabric covering removed.

Referring to the drawings, 1 designates the empennage or tail frame as a whole, which includes the side pieces 2 connected by crossed, diagonal bracing wires 3. Each side piece 2 comprises a pair of lower and upper longitudinally extending bars or rails 4 and 5, which are secured in practice at their forward ends to the framework of the upper and lower planes (not shown) of the machine. The bars 4 extend horizontally or substantially so when the machine is in a flying attitude, while the bars 5 incline downwardly and rearwardly at an angle, the bars thus having a relative convergence toward their rear ends. Struts 6 and 7 con-

nect the bars of each side piece at a point intermediate their ends and immediately in advance of their rear ends, respectively, the rear ends of the side pieces being united by a transverse yoke bar 8. Bracing wires 9 of suitable construction and arrangement are provided for connecting and staying the struts of each side piece to increase the strength and rigidity of the latter.

Pivoted to the center of the yoke bar 8 is a vertical rudder 9, extending to equal degrees above and below said bar, and to the shaft or axis 11 of this rudder is connected a forwardly extending arm 12, to which are secured the rear ends of controlling wires or cables 13. Hinged or pivoted to said yoke bar on opposite sides of said vertical rudder are also horizontal rudder sections or planes 14, having upwardly and downwardly projecting arms 15, suitably braced from the frames of said planes, and connected to the rear ends of wires or cables 16, the arrangement being such that both rudders may be raised or lowered in unison for vertical steering and longitudinal balancing actions. If desired, the horizontal rudders may also be operated in reverse directions in unison to serve as laterally balancing planes, as will be readily understood.

The inner edges of the horizontal rudder planes or sections are inclined and extend rearwardly in divergent relation to form an intervening space for the passage and swing of the vertical rudder 10, and hinged to the front edge of the yoke bar 8 is a horizontal transverse tail plane 17, which is movable in the guide spaces formed by the adjacent triangular portions of the side pieces 2 and extends entirely across the space between said side pieces. The ends of this plane, which thus serves as a stabilizing and supporting plane to sustain the weight of the tail frame, are thus partially housed in so as to reduce liability of injury thereto from fouling extraneous objects. Fastening members 19 are provided adjacent the ends of said tail plane for engagement with series of keeper openings 20 in the adjacent struts, whereby said plane may be fastened in different positions of adjustment to lie at different angles of incidence for supporting effect according to the amount of the load weight or other conditions governing or effecting the operation of the machine. The control wires or cables of the horizontal and vertical rudders lead

over suitable guides on the tail frame forward where they may be connected with suitable control devices upon the main frame in the usual or any preferred manner.

5 It will thus be seen that my invention provides a tail structure for aeroplanes which is of requisite strength and wherein provision is made for the support of horizontal and vertical rudders and a tail plane
10 from a single yoke or cross beam, thus securing simplicity of construction and the arrangement of the respective rudders and plane at a point to secure both steering and supporting efficiency. Also by mounting the
15 tail plane in the manner described such plane will be protected to a large extent from damage by contact with extraneous objects in launching and alighting and its lifting power may be increased by varying
20 its angle of incidence in the manner hereinbefore set forth.

I claim:

25 In a tail plane structure for aeroplanes, the combination of a tail frame having its side members formed of rearwardly converging spars extending to a V-point, a horizontal transverse bar secured to the converging spars of said side members and rigidly

uniting the latter, uprights connecting the spars of the side members at points in advance of said bar and forming therewith intervening triangular spaces at the rear ends
30 of the side members, horizontal rudder planes hinged to the rear edges of the transverse bar on opposite sides of the transverse bar, a vertical rudder hinged to
35 the bar and disposed between the proximate ends of the horizontal rudders, a supporting plane extending transversely of the tail frame in advance of the transverse bar, said
40 plane being hinged at its rear end to said bar for vertical movement and having its end portions extending through and movable in the said triangular spaces of the side
45 members, and means upon said supporting plane for adjustable engagement with the uprights of the side members, whereby said plane may be tilted upwardly at its forward edge to different angles of incidence.

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

GEORGE M. WANEE.

Witnesses:

CLARENCE COPE,
A. F. DERRICK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."