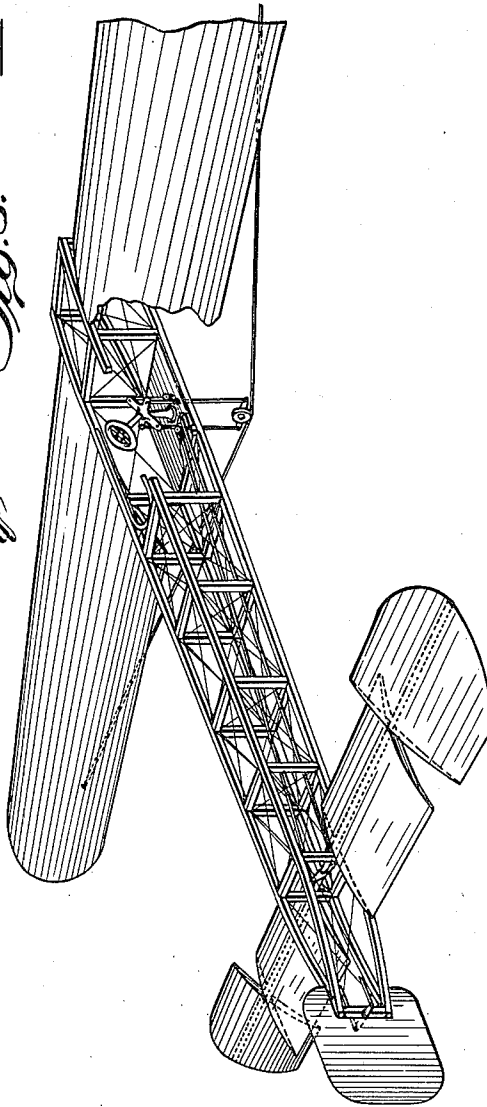
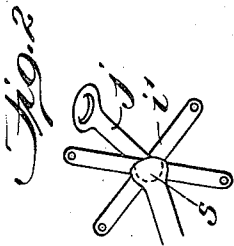
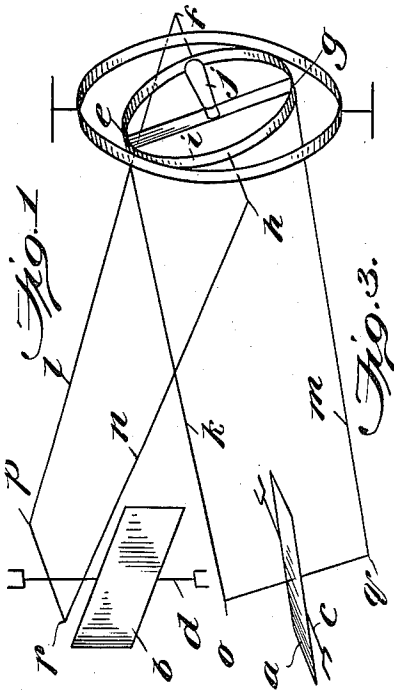


1,009,017.

2 SHEETS—SHEET 1.



B. J. Kesler

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L. BLÉRIOT.
BALANCING AND STEERING APPARATUS.
APPLICATION FILED JAN. 31, 1908.

1,009,017.

Patented Nov. 14, 1911.

2 SHEETS—SHEET 2.

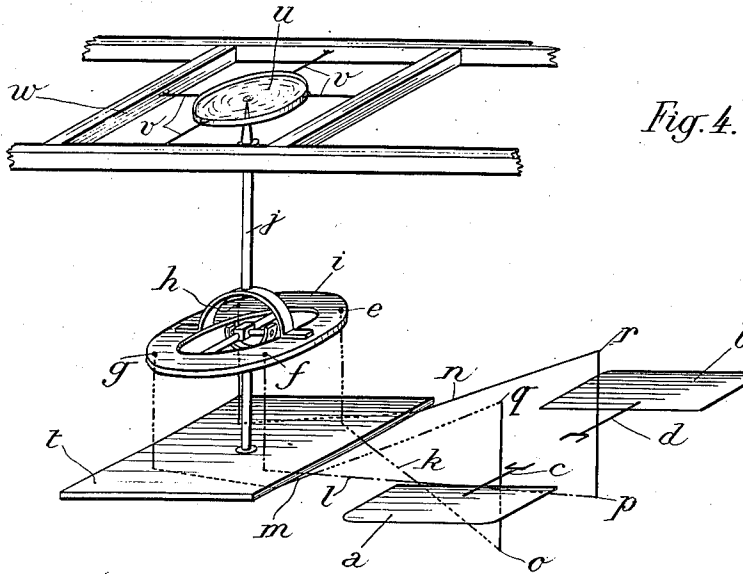


Fig. 4.

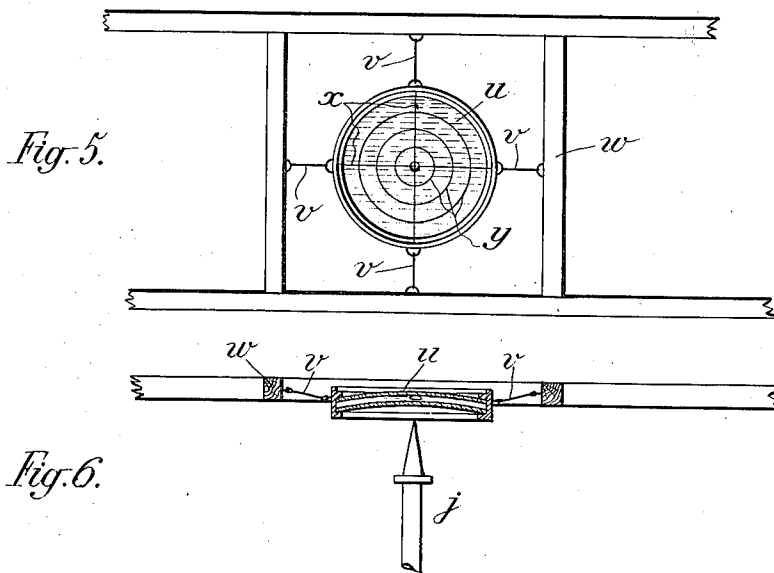


Fig. 5.

Fig. 6.

witnesses.

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BALANCING AND STEERING APPARATUS.

1,009,017.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed January 31, 1908. Serial No. 413,587.

To all whom it may concern:

Be it known that I, LOUIS BLÉRIOT, a citizen of the Republic of France, and a resident of Neuilly-sur-Seine, in France, have invented certain new and useful Improvements in Balancing and Steering Apparatus, of which the following is a specification.

This invention relates to the control of balancing and steering mechanism for aeroplanes, submarines and similar apparatus.

It has for its object to arrange the said control in such manner that it should be possible to operate all the parts of the above mentioned mechanism and to give them their exact position by means of a single handle or even automatically. And the said object is obtained by the method hereinafter described and shown in certain constructions in the accompanying drawings.

Figure 1 of the said drawings is a diagrammatic perspective view showing the application of the invention to the simultaneous control of the rudders the spindles of which are at a right angle to each other.

Fig. 2 is a perspective view showing a modified construction of controlling device. Fig. 3 is a perspective view illustrating the practical application of the construction shown in Fig. 2 to a "Blériot" monoplane. Fig. 4

is a perspective view showing a modified construction of the whole device shown in Fig. 2 and its combination with a level. Figs. 5 and 6 are a plan and section of the said level.

Let it be assumed first that there are to be controlled two rudders, the axes of which are at a right angle; one diving rudder *a* movable about a horizontal spindle *c*, and a steering rudder *b* movable about a vertical spindle *d*, as shown in, for instance, Fig. 1. In accordance with this invention, it is sufficient to connect, on the one hand, the ends *o* and *q* of the tiller of the rudder *a* by means of wires *k* and *m*, to diametrically opposite points *e* and *g* of a part *i* capable of being moved in any direction, and on the other hand, the ends *p* and *r* of the tiller of the rudder *b*, by means of wires *l* and *n*, to points *f* and *h* situated at the same distance from the center of the said part *i*, but on a diameter at a right angle to that on which are situated the points *e* and *g*. The part *i* is provided with a handle *j* and can be constituted either by a disk or by a ring mounted on a universal joint, as shown in Figs. 1

and 4. With this arrangement it is sufficient to move the handle *j* suitably in order to obtain simultaneous control of the two rudders. If the whole be arranged as shown in Fig. 1, that is to say, if the handle be normally horizontal, it is sufficient to direct it to the point toward which it is desired to go, in order to obtain at once simultaneous suitable positions for the two rudders. It will be readily understood that they will at once come into such position that the intersection of their planes will be parallel to the direction given to the handle.

The modified construction shown in Fig. 2 proceeds on the same principles as the construction shown in Fig. 1, but is especially applicable to systems of rudder control wherein the rudder spindles or shafts are slightly inclined with respect to one another or are in line with one another. In this construction the handle *j* is rigidly associated with a cruciform spider *i'*, the arms of which are connected in a suitable manner by wires, with the spindles or shafts to be controlled. The spider *i'* has a central universal mounting, its supporting means comprising a universal joint *s*. As shown, the arms of the spider are equidistant from one another, but it is manifest that this relation may be varied as conditions or environments may demand, all that is required being that the opposite arms are in alinement with one another. It will be apparent that the handle *j* may be turned upon the continuous axis of either pair of opposed arms of the spider, as when it is desired to produce an independent movement of a single rudder, or said handle may be turned in any other direction as when it is desired to produce particular simultaneous movements of both rudders.

In the cases just considered, the handle has been assumed to be horizontal, but in certain cases it may be advisable to arrange it in such manner that, as shown in Fig. 4 (in which it has been assumed that the tail was a rudder situated at the back of the center of the machine), it should be normally vertical. The arrangement then is also the same, with the difference that the wires are passed through a floor *t* forming a kind of guide pulley.

It is preferable, when the handle is vertical, to add to it a level, such as shown at *u*, which is preferably mounted by means of

elastic links or members *v* on a frame *w* which can be constituted by the frame of the machine itself, in such manner that the air bubble or indicator of the said level normally is over the handle. When the machine is inclined, the air bubble moves, and to bring the machine back to equilibrium it is sufficient to bring the handle below the said bubble and to follow it, while it gradually returns to the center of the level. The latter is preferably arranged as shown in Figs. 5 and 6, that is to say by means of a box having a transparent bottom and top. It will be advisable to arrange on it starting lines in such manner that the straight lines *x* correspond to the principal directions, and the concentric circles *y* correspond to the position of the bubble for a series of given inclinations.

Obviously the method could be applied not only to the control of two rudders, but also to the control of a larger number. It is sufficient to connect the wires of the said rudders to the desired points of the movable part.

What I claim as my invention and desire to secure by Letters Patent is—

1. Apparatus for the simultaneous control of several structurally independent and independently movable rudders comprising a part movable in every direction, a handle for operating it and wires connecting the

ends of the tiller of each rudder to diametrically opposite points of the movable part.

2. In an apparatus for the simultaneous control of several structurally independent and independently movable rudders, in combination, an operating part universally movable, and means for connecting the tillers of the different rudders to the movable part, the points of attachment of the connecting means on the movable part being all situated in one and the same plane passing through the center of rotation of the movable part.

3. In an apparatus for the simultaneous control of several structurally independent and independently movable rudders, in combination, an operating part universally movable, a handle therefor and wires connecting the tiller of each rudder to diametrically opposite points of the movable part, the points of attachment of the said wires on the operating part being all situated in one and the same plane passing through the center of rotation of the operating part.

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

LOUIS BLÉRIOT.

Witnesses:

H. C. COXE,
CHARLES WEISMANN.