

H. GAARA.
 STEERING DEVICE FOR AEROPLANES AND THE LIKE.
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997,612.

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Fig. 1.

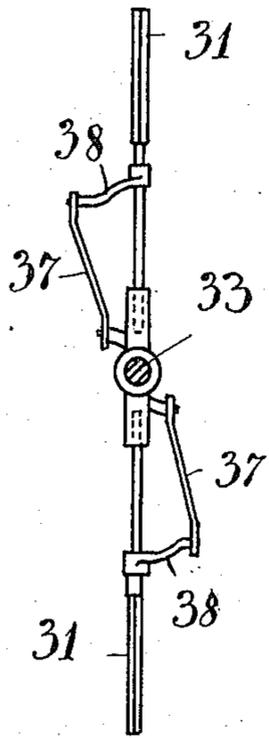
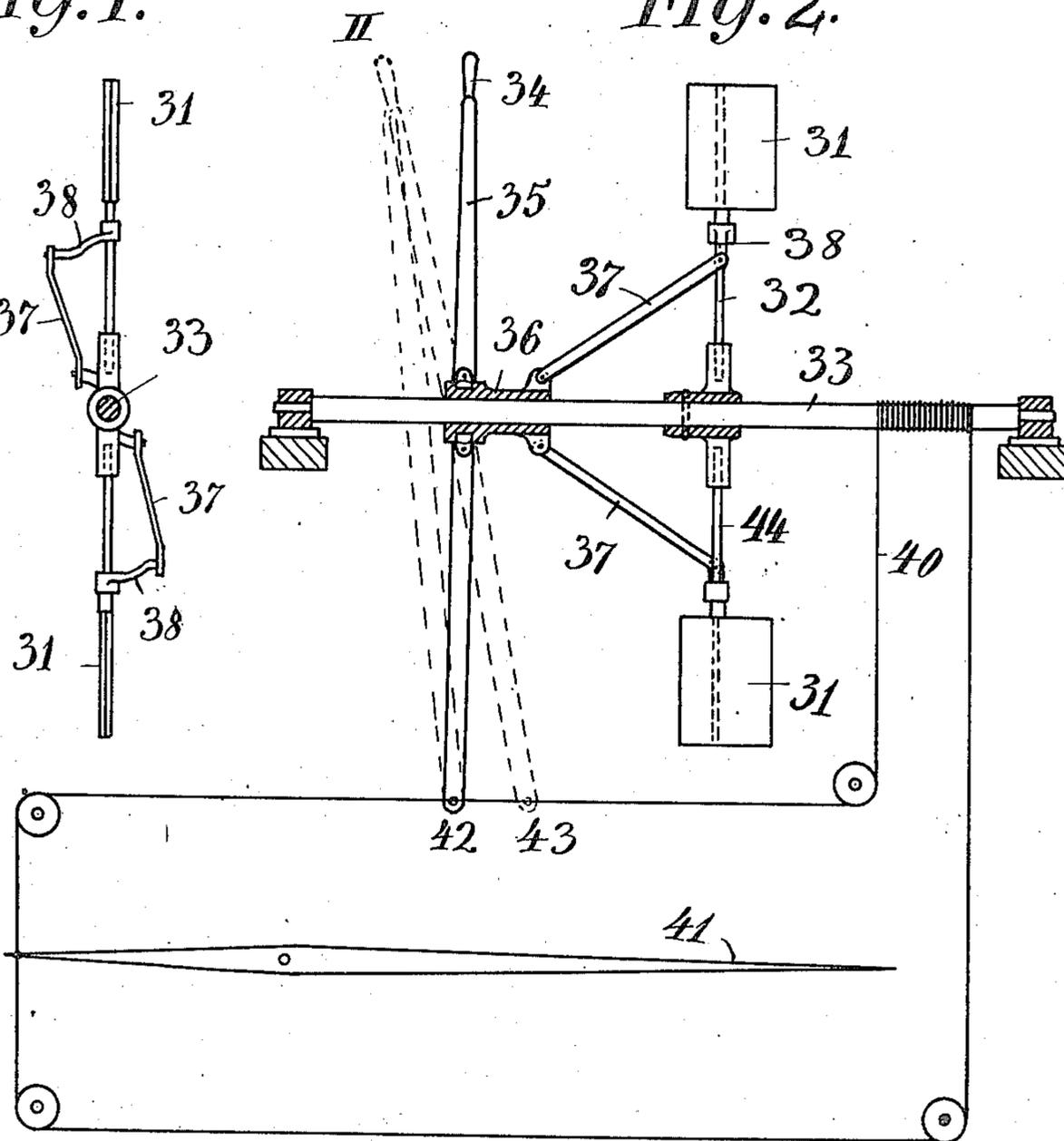


Fig. 2.



Witnesses.
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STEERING DEVICE FOR AEROPLANES AND THE LIKE.

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Specification of Letters Patent. Patented July 11, 1911.

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To all whom it may concern:

Be it known that I, HALVOR GAARA, a subject of the King of Norway, residing at Bö, Telemarken, Norway, have invented certain new and useful Improvements in Steering Devices for Aeroplanes and the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to steering devices for aeroplanes and the like, and has for its object to provide means whereby the manipulation of the rudders is facilitated.

Rudders of aeroplanes are difficult to handle on account of the great pressure which the air exerts on them, especially in certain conditions of weather; to facilitate the moving of the rudders they are generally pivoted at or near the center line of the rudder blade, but this does not overcome the difficulties.

According to my invention I combine the steering gear with adjustable propellers, so mounted on the aeroplane that when their blades are suitably adjusted the propeller will be set in motion by the air and by means of suitable gearing this motion is transferred to the rudders or to the movable planes. Such an arrangement is by way of example shown in the accompanying drawing, wherein—

Figure 1 is a side view and Fig. 2 an end view.

Referring in detail to the construction illustrated, 31 designates propeller blades pivotally mounted on arms 32, which are fixed on a shaft 33. An angular movement may be imparted to the blades 31 by means of a lever 35 which is connected to a sleeve 36, slidable on the shaft 33, which sleeve is connected by links 37 and arms 38 with the propeller blades. When the handle 34 of lever 35 is placed in the position II, the sleeve 36 is drawn forward and the propeller blades 31 are angularly displaced, and the wind pressure will rotate the shaft 33 (provided the direction of the wind is more or less parallel to the shaft). A rope 40 which is wound on the shaft, or on a wheel keyed to the same, and carried to one end of the rudder 41, is thereby moved, and the rudder

is operated accordingly. Instead of the rope 40 I may, of course, use any other transmission, for instance, a worm gear or toothed wheel gear.

There should exist a predetermined ratio between the angular displacement of the handle 34 and the number of revolutions or parts of revolutions of the shaft 33. In order to obtain this it is necessary that the propeller blades be automatically returned to their inoperative position, when the propeller has made the number of revolutions that correspond to the angular displacement of the handle. This automatic return to inoperative position may be effected by the mechanism itself and may be brought about in various ways. One way is illustrated in Fig. 1, wherein the lower end of the lever 35 is fixed to the rope 40. When the handle 34 is placed in the position II, the sleeve 36 will be drawn forward, and the shaft 33 will begin rotating. If the handle 34 is then kept in the position II, the rope 40 will draw the lower end of the lever from the point 42 to the point 43, returning the sleeve 36 to its initial position, and consequently the propeller blades to their inoperative position.

Owing to the small amount of force required for operating the rudders by aid of the above steering mechanism, the same may be coupled to the back of the seat of the operator or to his body, whereby the aeroplane may be kept in horizontal balance merely by the operator keeping his body in vertical position.

I claim—

1. In steering apparatus for aeroplanes and similar machines, the combination of a rudder, a shaft, a propeller carried by the shaft, an operative connection between said shaft and rudder, and means whereby the propeller blades may be adjusted from a position in which their planes are parallel with the shaft to an angular position relatively to said shaft.

2. In steering apparatus for aeroplanes and similar machines, the combination of a rudder, a shaft, arms on said shaft, adjustable propeller blades carried by said arms, an operative connection between said shaft and rudder, and means whereby said propeller blades are automatically returned to their original position.

3. In steering apparatus for aeroplanes and similar machines, the combination of a rudder, a shaft, arms on the said shaft, ad-

justable propeller blades on said arms, a sleeve sliding on the said shaft, connections between said sleeve and the propeller blades, a lever for operating the said sleeve, and an
5 endless rope connecting said shaft with the rudder.

4. In steering apparatus for aeroplanes and similar machines, the combination of a rudder, a shaft, arms on the said shaft, ad-
10 justable propeller blades on said arms, a sleeve sliding on the said shaft or rotatable member, connections between said sleeve and

the propeller blades, a lever for operating the said sleeve, and an endless rope connecting said shaft with the rudder and fastened
15 to the pivotal point of the said operating lever.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HALVOR GAARA.

Witnesses:

VALDEMAR CHRISTENSEN,
PAUL DAHMCKE.