D. MacKAY.

AEROPLANE.

APPLICATION FILED MAR. 14, 1916.

1,215,295.

Patented Feb. 6, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

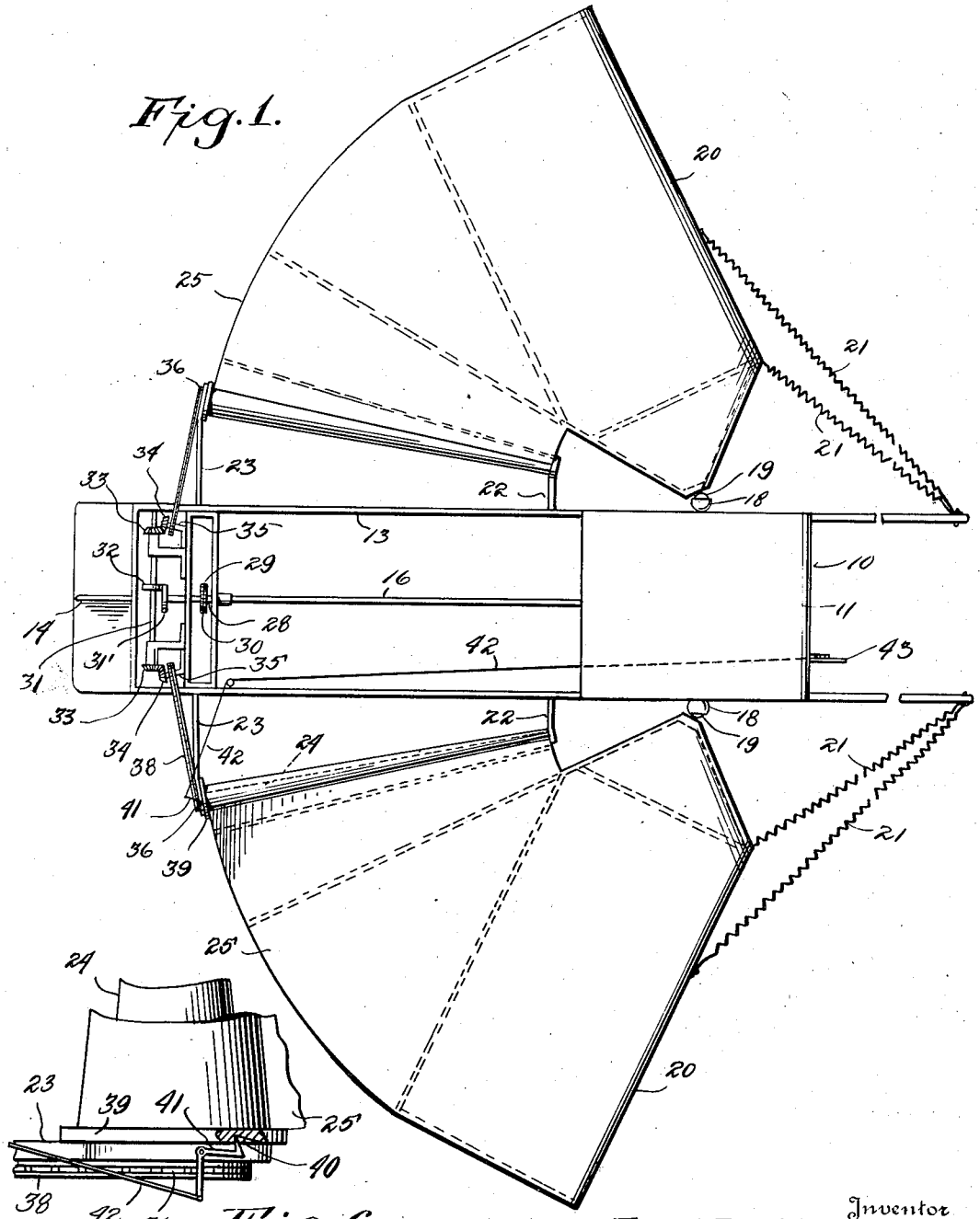


Fig. 6.

Witnesses

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2 SHEETS—SHEET 2.

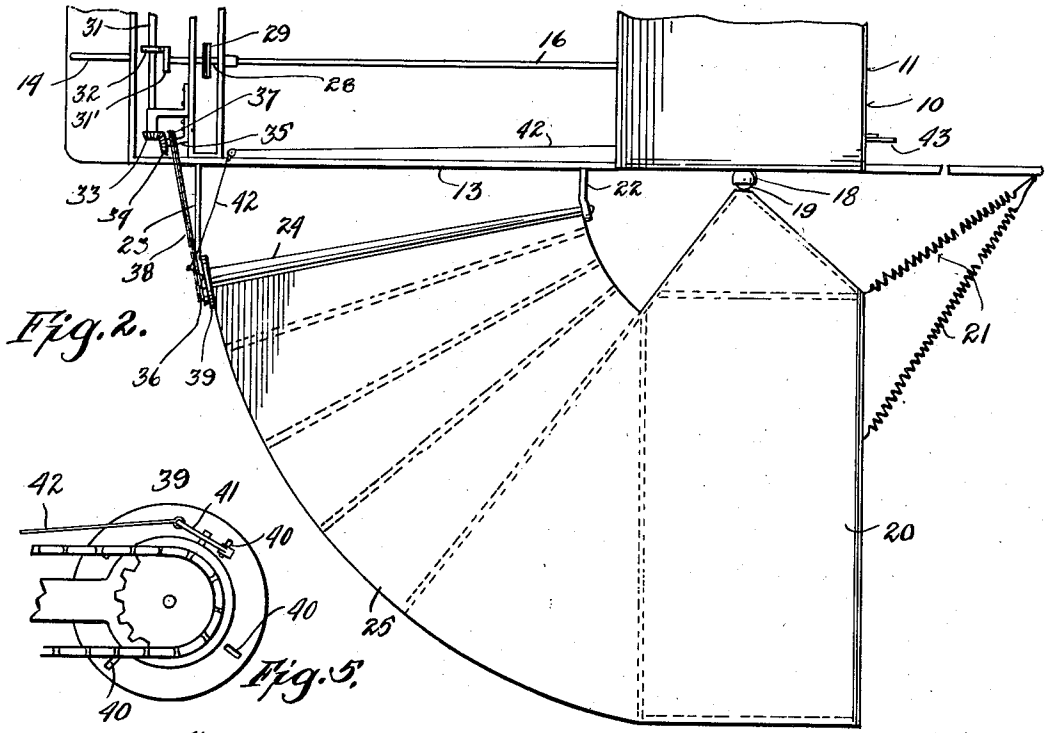


Fig. 2.

Fig. 5.

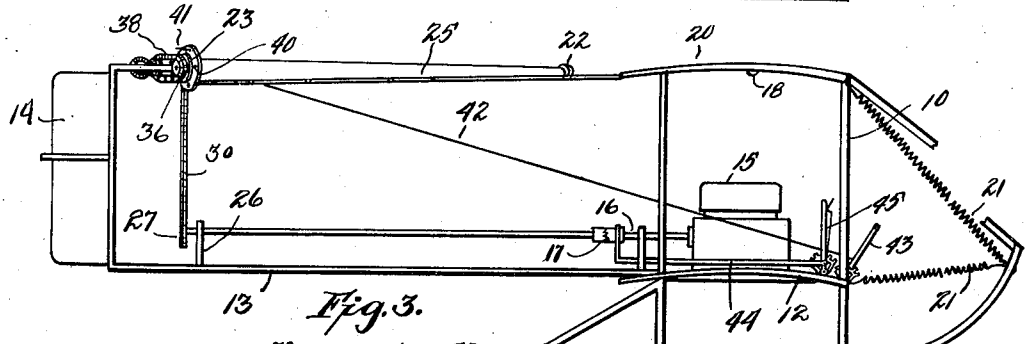


Fig. 3.

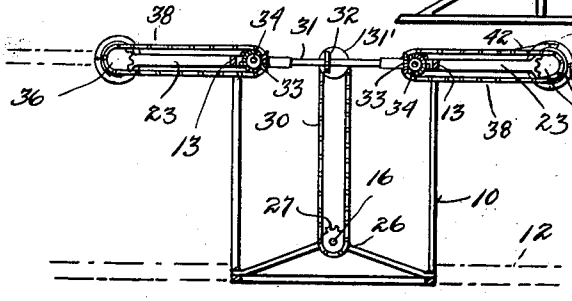


Fig. 4.

Witnesses

[illegible]

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UNITED STATES PATENT OFFICE.

DONALD MacKAY, OF THETFORD CENTER, VERMONT.

AEROPLANE.

1,215,295. Specification of Letters Patent. Patented Feb. 6, 1917.

Application filed March 14, 1916. Serial No. 84,197.

To all whom it may concern:

Be it known that I, DONALD MacKAY, a citizen of the United States, residing at Thetford Center, in the county of Orange, State of Vermont, have invented certain new and useful Improvements in Aeroplanes; 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.

This invention relates to improvements in aerostructures, and particularly to aeroplanes.

The principal object of the present invention is to provide a novel and simple means for increasing or decreasing the plane surface to accord with the change in speed of the machine.

Another object is to provide an auxiliary plane surface connected to and movable with the rear edges of the main sustaining plane which can be quickly and effectively extended or withdrawn as desired by the aviator.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawing.

In the drawing:

Figure 1 is a top plan view of an aeroplane made in accordance with my invention and in the position for high speed;

Fig. 2 is a top plan view of one half of the aeroplane showing the position of the parts when traveling at low speed;

Fig. 3 is a side elevation;

Fig. 4 is a fragmentary rear elevation;

Fig. 5 is a detail view of the releasing latch for one of the rollers; and

Fig. 6 is a top plan view of the same.

Referring particularly to the accompanying drawings, the body of the aeroplane includes the properly braced structure 10 having the upper and lower planes 11 and 12. This structure also includes the skids or runners 12′ and the rearwardly extending frame 13 which supports the rudder 14. On the structure 10 is mounted the engine 15, the shaft of which extends rearwardly as shown at 16 and is provided with a clutch 17, the purpose of which will appear later. On each end of the upper plane 11 is a socket member 18 which receives the ball 19 carried by the inner tapering end of the pivoted plane 20. The forward edge of this plane is connected to the forward part of the runners or skids 12′ by means of the springs 21 which normally draw and hold the planes in their normal positions as shown in Fig. 2. Mounted on each side of the upper portion of the frame 13 are the brackets 22 and 23, said brackets supporting a roller 24 which tapers inwardly toward the ball and socket joint 18 and 19. Wound on this roller is a flexible curtain 25, the free edge of which is secured to the rear edge of the plane 20, or may form an integral part of the fabric covering of the plane. The marginal edges of the curtain 25 are formed on lines which are concentric arcs having for their center the ball and socket joint 18 and 19. The springs 21 normally draw the planes 20 into forward position to unroll the curtain 25 and thus increase the plane surface.

The shaft 16 has its rear end supported in a bearing 26, and on this end of the shaft is mounted a sprocket wheel 27. A shaft 28 extends rearwardly in the upper part of the frame 13, and carries on its rear end portion a sprocket 29, a chain 30 being engaged around this sprocket and the sprocket 27. Extending transversely in the upper part of the rear of the frame 13, and at the rear end of the shaft 28 is a countershaft 31, which is driven from the shaft 28 by means of the intermeshing gears 31 and 32, carried respectively by the shafts. The ends of the shaft 31 are provided with beveled pinions 33 which mesh with similar pinions 34 carried by the canted shafts 35 suitably mounted adjacent the ends of the shaft 31. On the rear end of each of the rollers 24 there is a sprocket wheel 36 which is driven from the shaft 35 by means of the sprockets 37 carried by the shafts 35 and the chains 38 engage around said sprockets. A flange 39 is also formed on the rear end of each of the rollers 24 which is provided with a plurality of notches 40 for engagement by a pivoted pawl 41 mounted on the bracket 23. Connected to this pawl is a cord 42 which extends forwardly where it is connected to a lever 43 within convenient reach of the operator.

Connected to the clutch 17 is a link 44 which extends forwardly of the structure 10 and is pivotally connected with an operating lever 45, by means of which the clutch may be thrown into and out of operation.

In normal running position the springs

21 draw the planes 20 forwardly into such positions that they extend in alinement at opposite sides of the short plane section 11. This is the position when the machine is traveling at a comparatively low rate of speed and when a larger plane surface is required. This forward position of the planes 20 unwinds the curtain 25 so that the rear of each of the planes is increased by the amount of the curtain between the rear edge of the plane and the roller 24. When the speed of the machine is to be increased, and a lesser amount of plane surface is required, the clutch 17 is thrown in.

The motor 15 will thus communicate motion to the shaft 28 and rotate the beforementioned rollers 24 to wind up the curtains 25 and thus reduce the plane surface, while at the same time swinging the planes 20 backwardly as clearly shown in Fig. 1. The detents 41 will then engage with a notch of each of the disks 39 and hold the planes 20 in their rearwardly inclined positions. When an increased plane surface is needed, and it is always needed at an extremely short notice, the detents 41 can be drawn from engagement with the notches of the disks 39 and permit the springs 21 to instantly draw the planes 20 into their forward positions and thus unroll the curtains 25 to the desired degree.

From the foregoing it will be seen that I have provided a novel and efficient device whereby the aviator can quickly and easily increase or decrease his plane surface as quickly and to as great or less extent as desired. The operating levers for controlling the winding and unwinding of the additional plane surfaces, and the swinging of the planes are within convenient reach for instant use.

What is claimed is:

1. In an aerostructure, a frame, sustaining planes movably mounted on the frame, flexible auxiliary plane surfaces connected to the sustaining planes at their one end and windable on the frame at their other ends, means for causing the winding of the flexible planes to move the sustaining planes rearwardly, means for moving and holding the sustaining planes in a forward position yieldably, and holding means for the flexible plane surfaces releasable to permit the said plane surfaces to be unwound by the sustaining planes.

2. In an aerostructure, a frame, sustaining planes mounted on the frame at the sides thereof and shiftable forwardly and rearwardly, auxiliary plane surfaces connected to the sustaining planes and movable forwardly thereby, and means for simultaneously reducing the exposed areas of the auxiliary plane surfaces and moving the sustaining planes rearwardly.

3. In an aerostructure, a frame, sustaining planes pivotally mounted at the sides of the frame and movable forwardly and rearwardly, rollers mounted rearwardly of these planes, auxiliary plane surfaces rolled thereon and connected to the said planes, means for shifting the planes forwardly, means for controlling the unwinding movements of the rollers, and means for rotating the rollers to cause the simultaneous winding of the auxiliary plane surfaces and movement of the sustaining planes.

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

DONALD MacKAY.

Witnesses:
GEO. F. CHANDLER,
ELIZABETH M. F. CHANDLER.

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