

Feb. 4, 1936.

C. PETERSON

2,029,503

AUTOMATIC CHANGE PITCH PROPELLER

Filed June 29, 1935

3 Sheets-Sheet 1

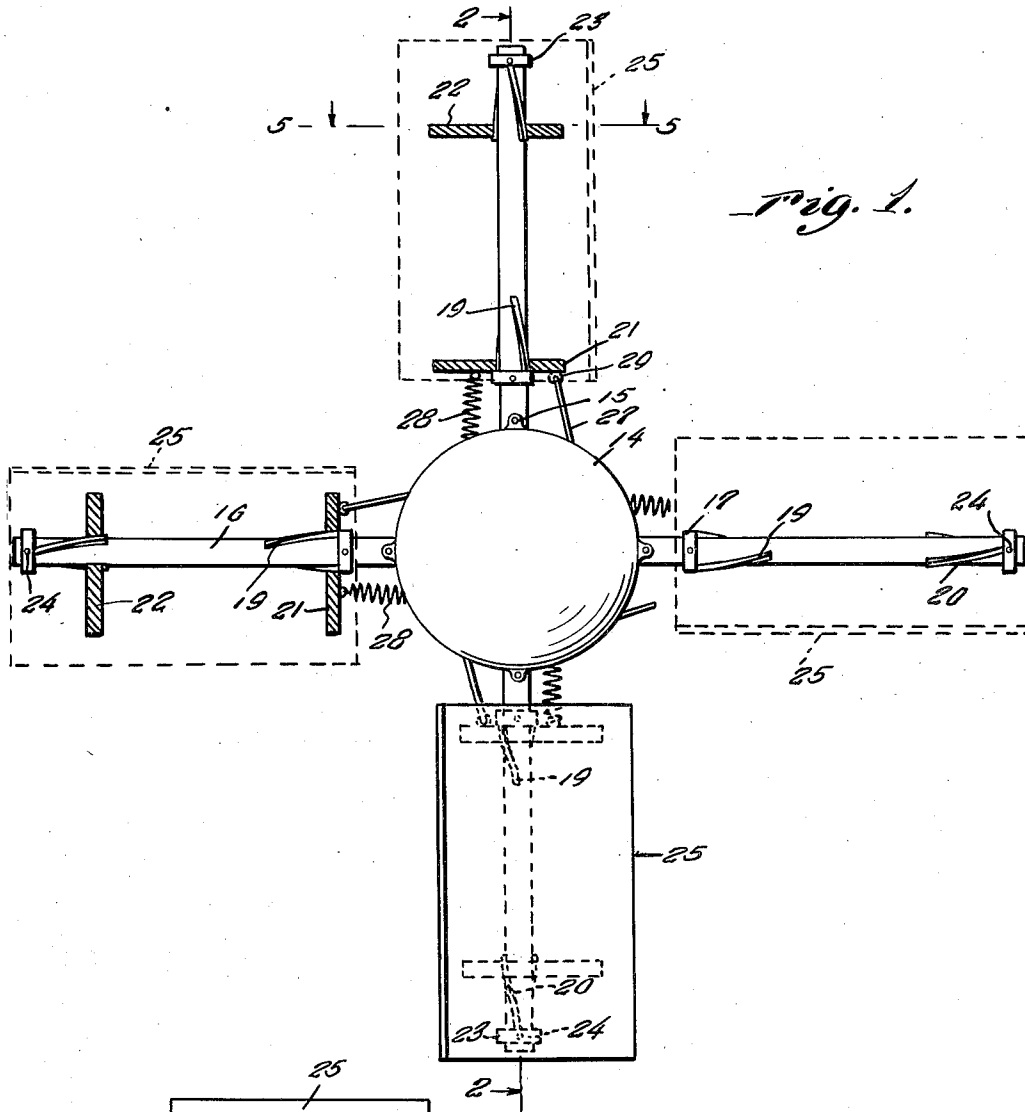


Fig. 1.

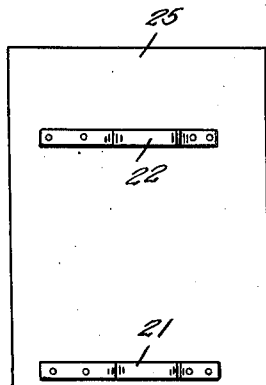


Fig. 2.

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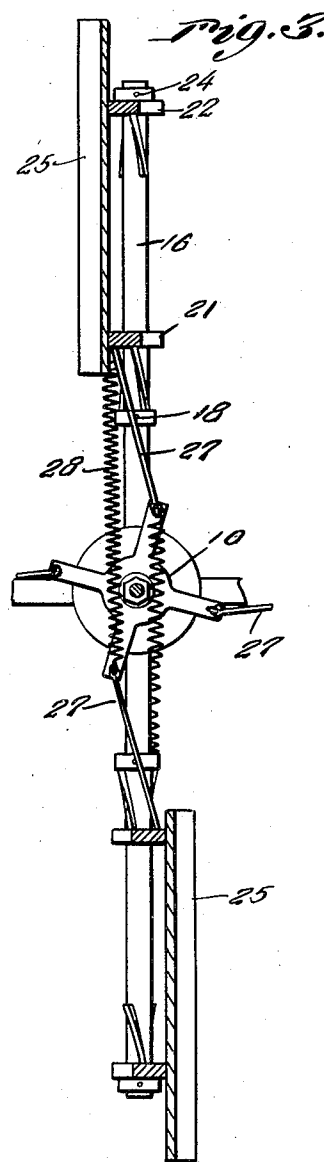
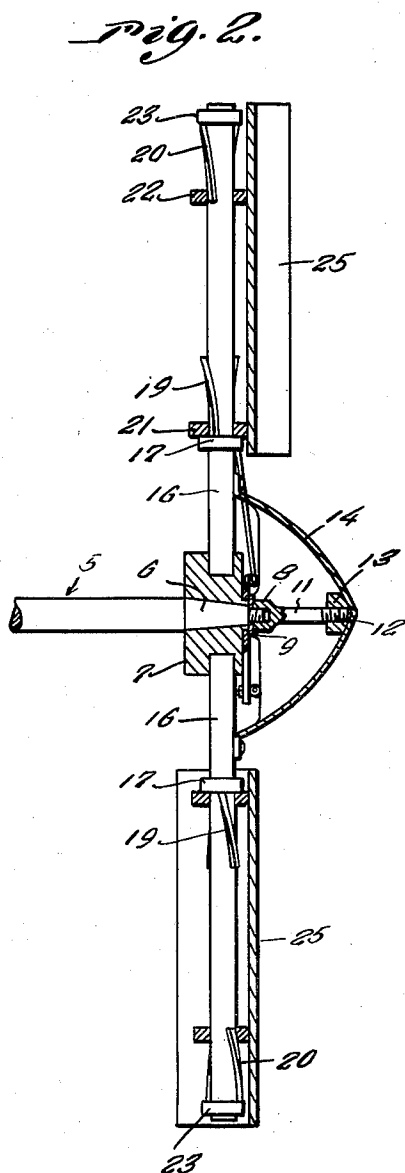
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Fig. 4.

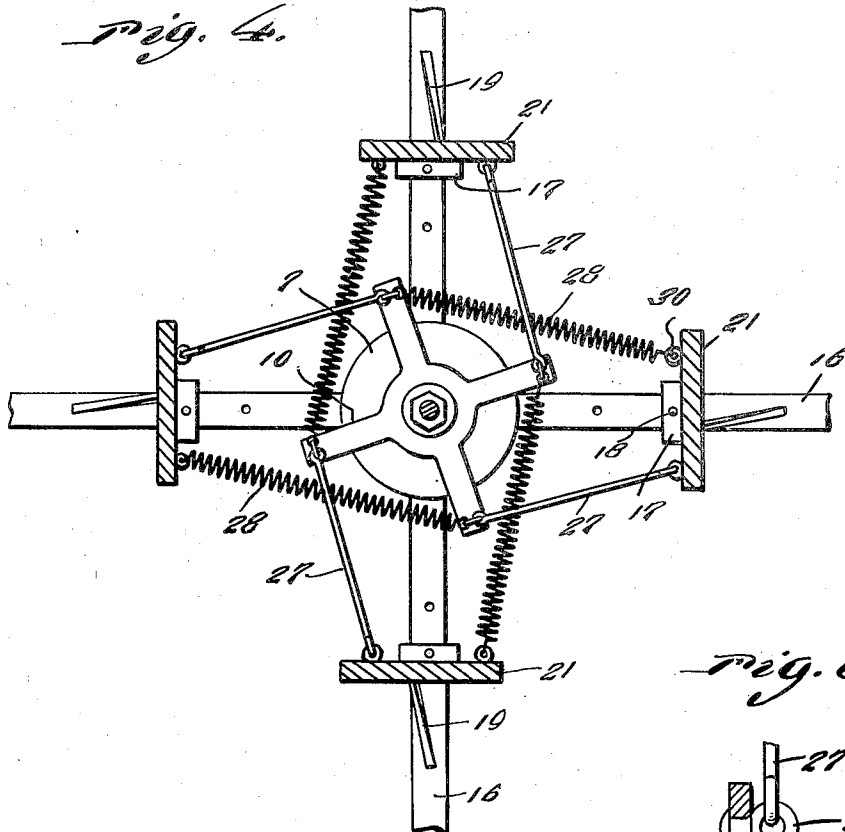


Fig. 6.

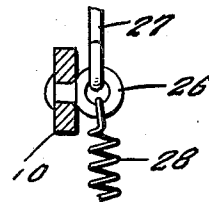
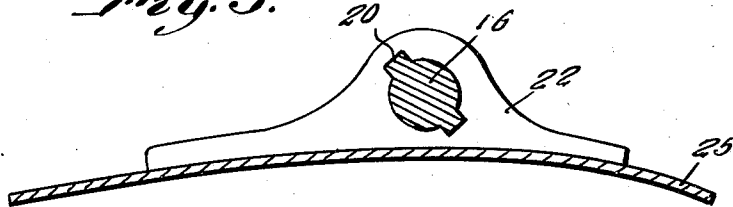


Fig. 5.



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UNITED STATES PATENT OFFICE

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AUTOMATIC CHANGE PITCH PROPELLER

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of forty per cent to Axel Nelson, Florence, Wis.

Application June 29, 1935, Serial No. 29,139

1 Claim. (Cl. 170—162)

My invention relates generally to an automatic change pitch propeller, and particularly to such a propeller in which the pitch of the blades is automatically changed through the action of centrifugal force and of wind pressure on the blades, and an important object of my invention is to provide a simple and mechanically efficient propeller of the character indicated.

Other important objects of my invention will be apparent from a reading of the following description in connection with the drawings, wherein for purposes of illustration I have shown a preferred embodiment of my invention.

In the drawings:—

Figure 1 is a front elevational view of the embodiment with the airfoil portions of the propeller blades shown in dotted lines.

Figure 2 is a transverse vertical sectional view taken through Figure 1 approximately on the line 2—2 and looking toward the right in the direction of the arrows.

Figure 3 is a front elevational view of a portion of the propeller with the hub cap removed.

Figure 4 is an enlarged view similar to Figure 3 but showing the arrangement of the operating mechanism in which the propeller blades are full into the wind, whereas Figure 3 shows the arrangement of the operating mechanism in which the propeller blades are substantially full out of the wind.

Figure 5 is a horizontal sectional view taken through Figure 1 approximately on the line 5—5 and looking downwardly in the direction of the arrows.

Figure 6 is a transverse sectional view taken through one of the arms of the equalizer showing the eye thereon to which the corresponding connecting rod and retracting spring is connected.

Referring in detail to the drawings, the numeral 5 refers generally to the propeller shaft which has a tapered end portion 6 on which the hub 7 is fitted and held in place by a nut 8 working against a washer 9, with the equalizer 10 rotatably mounted between the washer on a protuberance on the front of the hub.

The nut 8 has the reduced extension 11 which is oppositely threaded to the nut 8 as indicated by the numeral 12 in a nut portion 13 on the back of the hub cap 14, so that when the nut 8 is tightened on the front end of the propeller shaft 5 the hub cap 14 will be braced against the blades and the member 11 will act as a truss, so as to reinforce the entire structure. The hub cap has lugs 15 which are fastened to the propeller blade shafts as shown.

Each of the propeller blade shafts 16 is a suitable rod having radially outwardly spaced from the hub 7 a stop collar 17 locked in place by a set screw 18, and outwardly of this spiral splines 19 and 20 on which are slidable the brackets 21 and 22 which have openings to conformably receive the splines and the shaft 16 between the stop collar 17 and the radially outward stop collar 23 which is also held in place by a set screw 24. The brackets 21 and 22 are so spaced that the propeller blade airfoils 25 to one side of which the same are connected, can move radially along the blade shaft 16 between the stop collars 17 and 23 and in so doing rotate into and out of the wind.

The airfoils 25 have an appropriate curvature as illustrated in Figure 5, in accordance with the size and arrangement and application of the propeller.

The equalizer 10 comprises a rotatable plate having four equally spaced arms to the radially outward end of each of which is attached an eye 26 which anchors the radially inward end of the corresponding connecting rod 27 and the radially inward end of the corresponding retracting spring 28.

The radially outward end of the connecting rod 27 is pivotally connected to the underside of the corresponding inner bracket 21 as indicated by the numeral 29, while the radially outward end of the corresponding retracting spring 28 is connected to the radially inward side of the diametrically opposite blade bracket 21 as indicated by the numeral 30 in Figure 4. It will be noticed that the connection of the connecting rod and the related retracting spring 28 to the diametrically opposed blade brackets is on the same side of the axis of the propeller and that the springs and connecting rods on the diametrically related propeller blades are diametrically opposed as clearly indicated in Figure 4.

It is obvious that with a strong head wind working against the airfoils 25 of the propeller blades, that the propeller blades will be worked along the splines 20 and 19 in a radially inward direction so that the airfoils will be thereby rotated on the blade shafts out of the wind, this movement of the airfoils being assisted by the various retracting springs.

When there is little head wind and the propeller naturally rotates at a higher rate of speed, centrifugal force will act against the tension of the springs 28 to move the airfoils radially outwardly along the splines so as to cause the air-

foils to turn into the wind. The springs and the arrangement of the airfoils are such that the speed of the propeller is kept substantially constant whether the propeller is working in a strong head wind or with little head wind.

5 Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not desire to limit the application of the invention thereto, and any
10 change or changes may be made in the materials, and in the structure and arrangement of the parts, within the spirit of the invention and the scope of the subjoined claim.

What is claimed is:—

15 An automatic change pitch propeller of the class described comprising a hub, blade shafts radiating from said hub, said blade shafts having secured thereon spiral splines, airfoils mounted on said shafts and slidable along said splines
20 on rotation of said airfoils, and equalizer rotat-

ably mounted on said hub having spaced arms radiating therefrom, there being provided an arm for each blade radiating shaft, a connecting rod having one end connected to one side of each of said airfoils and the other end to one of the arms of the equalizer, a retracting spring having one end connected to each side of the airfoils at a point on the opposite side of the shaft to which the connecting rod is connected the other end of the retracting spring being connected to another of the arms of the equalizer, the springs and connecting rods of diametrically related area foils being diametrically opposed, and of such a character that centrifugal movement of the airfoils is coordinately transmitted through the equalizer and exerted upon the spring means for coordinately positioning said airfoils at greater or less angulations to the plane in which the blade shafts lie.

CHARLES PETERSON. 20