Dec. 8, 1931. P. G. BENDER ET AL 1,835,372

PROPELLER STRUCTURE

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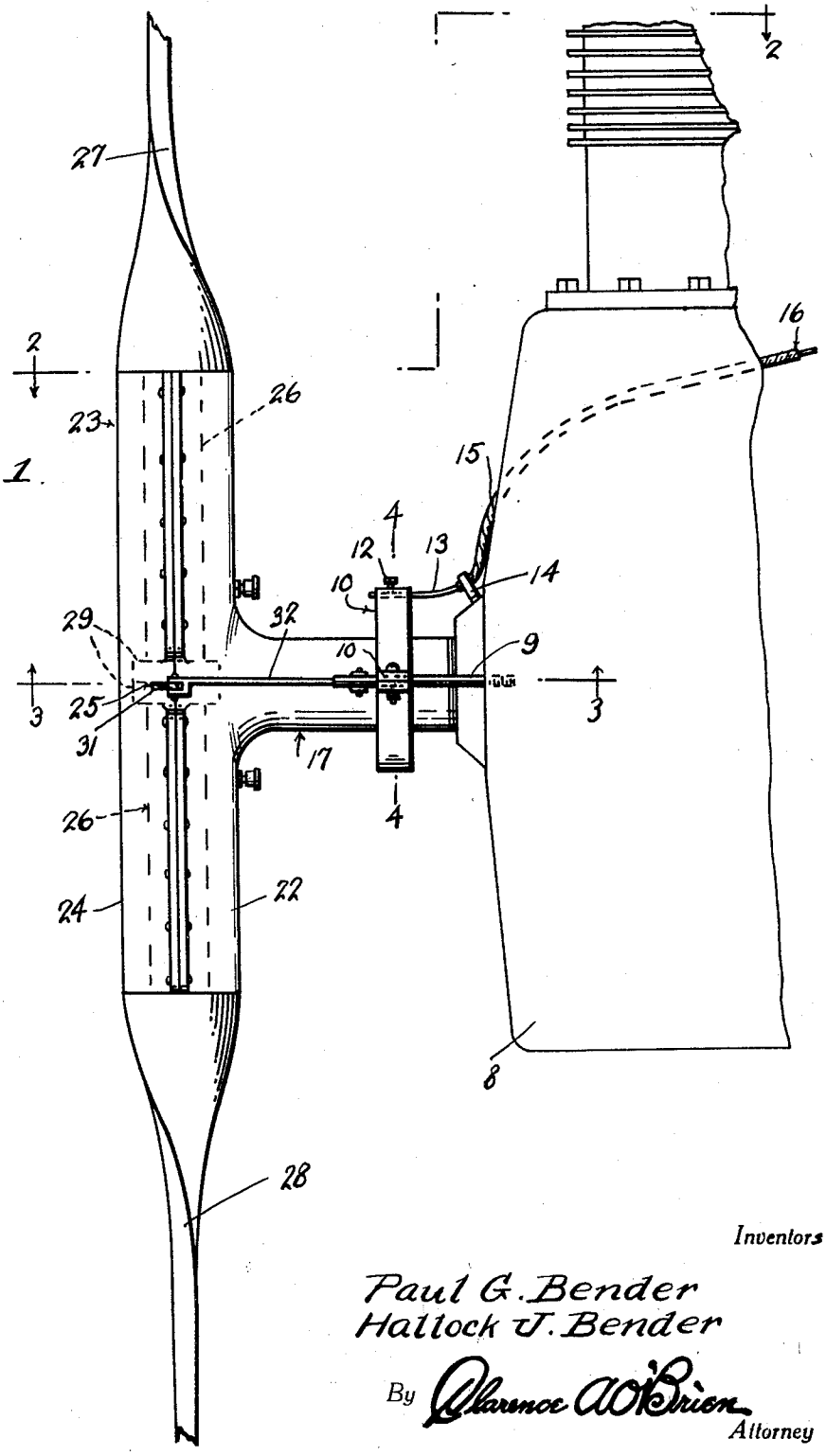


Fig. 1.

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PROPELLER STRUCTURE

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Fig. 2.

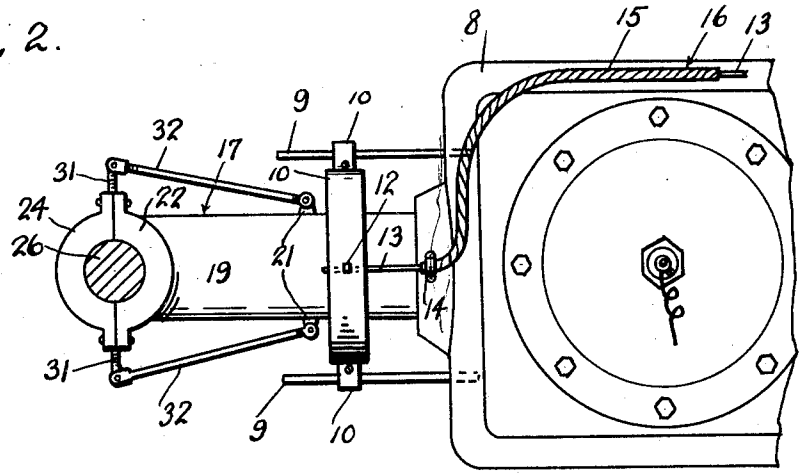
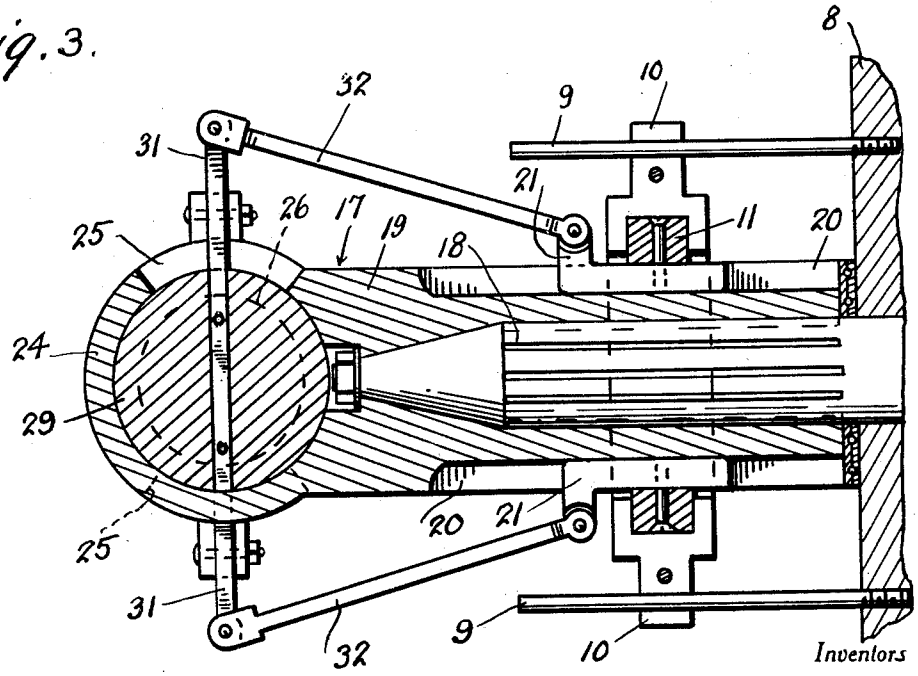


Fig. 3.



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Fig. 4.

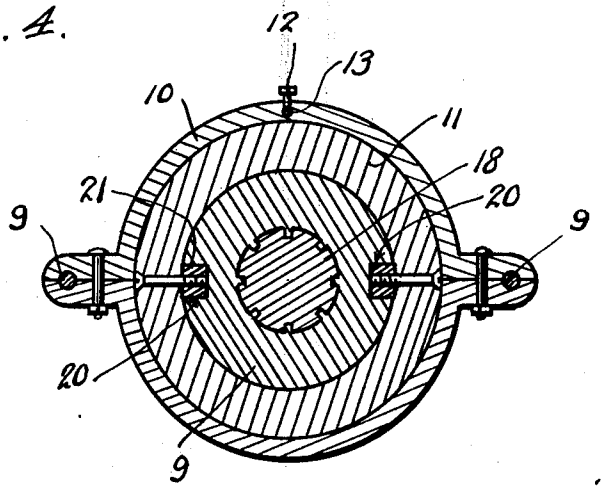


Fig. 5.

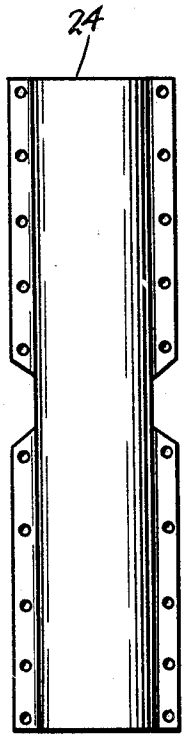


Fig. 6.

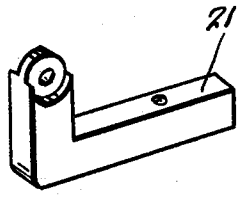
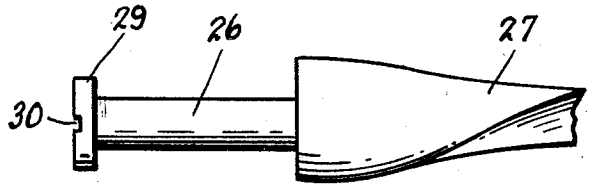


Fig. 7.



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UNITED STATES PATENT OFFICE

PAUL G. BENDER AND HALLOCK J. BENDER, OF BETHANY, MISSOURI

PROPELLER STRUCTURE

Application filed June 20, 1930. Serial No. 462,565.

This invention relates to an improved propeller construction especially, but not necessarily, adapted for use and association with aeronautical conveyances, and especially airplanes.

The purpose of the invention is to provide a practical and feasible organization of parts for adjusting the companion blades or sections of a two-part propeller which permits safer and more dependable control of the flight, to promote proper regulation of speed, and to otherwise fulfill the requirements of variable propeller adjustments.

In carrying the inventive conception into practice, we have elected and brought into proper mechanical organization suitably matched and co-operable details presenting the requisite mechanical relationship to expedite adjustment of the propeller blades from a single remote control within convenient reach of the pilot or operator.

Our primary aim is to improve upon propeller constructions by providing an arrangement which is characterized by simplicity, economy, and further individualized by the presence of separable renewable and interchangeable parts.

Other features, advantages, and objects will become more readily apparent from the following description and drawings.

In the drawings:

Figure 1 shows a fragmentary portion of a motor provided with a propeller developed in accordance with the present inventive conception.

Figure 2 is a horizontal section taken approximately on the plane of the irregular line 2—2 of Figure 1.

Figure 3 is a true horizontal section on the line 3—3 of Figure 1, with portions shown in elevation.

Figure 4 is an enlarged cross section on the line 4—4 of Figure 1.

Figures 5, 6, and 7 are detail views.

In the drawings, the motor is generally represented by the ordinal 8. As shown in Figure 3, the numerals 9 designate a pair of spaced parallel guide bars fastened to and projecting outwardly beyond the end of the motor. Slidably mounted on these rods is a two-part annulus 10 having its body portion of channelshaped cross section to provide a bearing for rotatable reception of a collar 11.

Incidently, the numeral 12 designates a set screw for securing the push-pull wire or rod 13 of the operating means to the collar. The numeral 14 designates a retention clip on the motor for holding in place the flexible tube 15. The complete tube and rod as a unit constituting the operating means is generally represented by the numeral 16. The operating end thereof is located within convenient reach of the operator in the machine.

The numeral 17 designates generally a hub structure the tubular housing part 19 of which is keyed to the propeller shaft 18. This housing is provided with diametrically opposite grooves 20 slidably receiving the lugs or shoes 21. These shoes are pivoted or otherwise fastened to the rotating collar 11.

Formed integral with the outer end of the body 19 is a laterally directed half-section 22 of the propeller housing or casing 23. This part 22 is substantially semi-circular in cross section and is associated with the complemental section 24. Both of these sections are provided with flanges suitably secured together as shown in Figure 1.

The numerals 25 in Figure 3 designate arcuate guide slots. This substantially circular housing 23 accommodates the stem portions 26 of the companion section 27 and 28 of the two-part propeller. These parts 27 and 28 may be designated as the twisted blade portion of the propeller. The stem portions thereof are formed with abutting heads 29 each of which is provided with a kerf 30 (see Figure 7) to accommodate the operating arm 31 (see Figure 3). These arms 31 extend in opposite directions and pass through the slots 25.

These projecting ends are pivotally connected with the adjacent forked ends of the links 32 located on diametrically opposite sides of the hub structure. The links converge inwardly and are pivotally connected at their inner ends with the projecting end portions of the aforesaid slides or shoes 21.

It is understood that the relatively stationary parts of this structure are the guide

rods 9 on the motor block 8 together with the annular slidable bearing 10 carried by these rods. The shaft 18 and its housing 19 are rotatable as are the shoes 21 and the ring or collar 11 carried thereby. The shoes, collar, and annular bearing form the slidable unit which under the control of the operating device 16 may be moved in or out with respect to the motor block.

Through the medium of the link connections 32 and the complemental arm 31, the sections 27 and 28 of the propeller may be turned as a unit in the casing 23, thus permitting the angularity of these companion parts 27 and 28 to be regulated according to variable flight conditions.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Minor changes in shape, size, and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice if deisred.

We claim:

In a structure of the class described, in combination, a motor block, a pair of spaced parallel guide rods secured to and projecting outwardly from the block, a rotary propeller shaft projecting outwardly from the block and disposed intermediate said guide rods, an annular bearing slidably mounted on said guide rods, a hub keyed on said shaft, said hub having grooves formed therein, shoes slidable in said grooves, a collar surrounding the hub and fastened to said shoes and mounted for rotation in said bearing, said hub including a right-angularly disposed bearing forming casing, a pair of propellers including stem portions mounted for oscillation in said bearing casing, and operating means connected with said stem portion, each stem having a head at its inner end provided with a kerf, an arm fastened in each kerf, said arms extending in opposite directions, and said bearing casing having upper and lower slots therein through which the arms pass, and links pivotally connected with the outer ends of said arms and with adjacent end portions of said shoes, and a remote control device operatively connected with said bearing for moving it in and out on said rods for effecting oscillatory adjustment of the propeller blades.

In testimony whereof we affix our signatures.

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