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G. FEIGE

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PROPELLER

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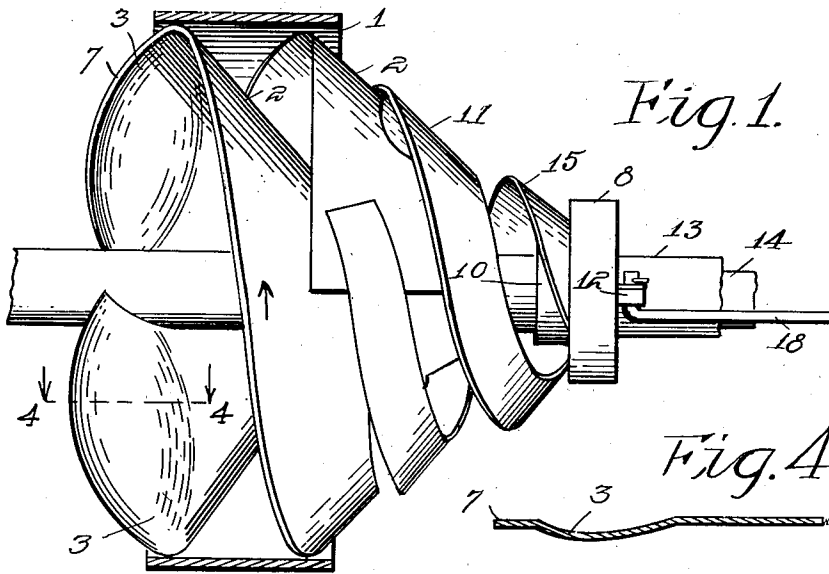


Fig. 1.

Fig. 4.

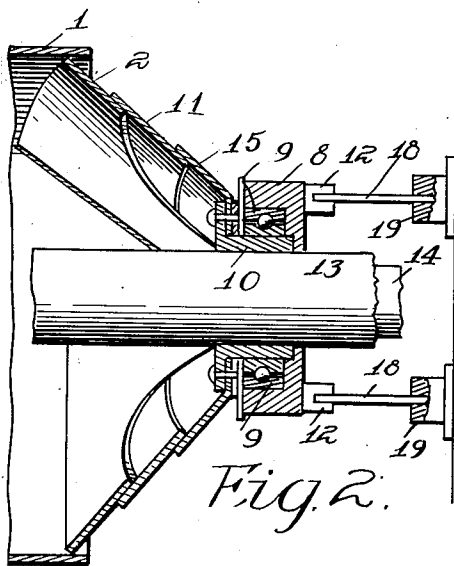


Fig. 2.

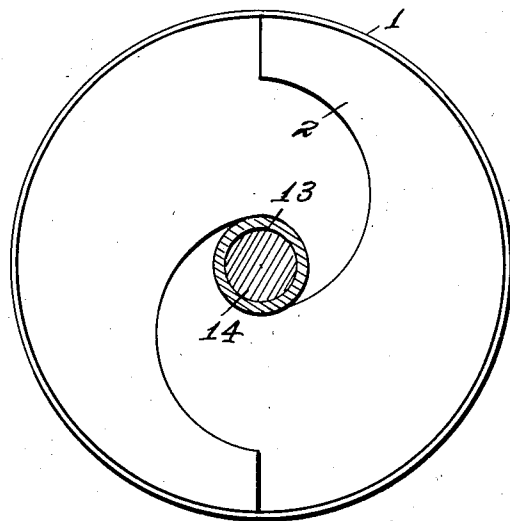


Fig. 3.

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PROPELLER

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2 Claims. (Cl. 60—35.5)

My invention relates to the art of propellers and is especially designed for use as an air propeller.

The objects of my invention are to provide an air propeller of simple, durable and inexpensive construction which may be used for such purposes as, for instance, air plane propulsion, and specifically, to provide a propeller of this character in which a given amount of power applied to a propeller shaft will give an increased forward thrust to the vehicle to which it is attached.

A further object is to provide means whereby the operator may readily, quickly and easily control with great accuracy the amount of forward thrust created by the propeller without stopping the propeller in its rotation, or the engine by which the propeller is driven, and further in this connection, to provide means whereby when the propeller is applied to a vehicle such, for instance, as an airplane, the speed of advance of the airplane may be quickly and easily retarded to a substantial degree by counteracting the advance thrust of the propeller without stopping its rotation, and whereby said control device may be effectively utilized in the landing of airplanes on landing fields of limited area.

Figure 1 shows a side elevation of my improved propeller, the cylinder being shown in longitudinal sections.

Figure 2 shows a longitudinal sectional view of a portion of my improved propeller and illustrating my improved air control device in its closed position.

Figure 3 shows a rear elevation of my improved propeller, the shaft being in section; and

Figure 4 shows a detail sectional view on the line 4—4 of Figure 1.

Referring to the accompanying drawing I have used the reference numeral 14 to indicate the propeller shaft which may be rotated in any ordinary manner, preferably by being connected to an engine. On this shaft is fixed the sleeve 13.

Fixed to the sleeve are two propeller blades indicated generally by the reference numeral 2 and being arranged spirally around the shaft. These blades are equally spaced apart and they are inclined from the shaft forwardly and outwardly at an angle of about 45°. At the forward end of each blade is a forwardly extended rounded projection 7, and immediately in the rear of the central portion of this rounded extension 7 is a curved depression 3. These depressions, as clearly shown in Figures 1 and 4 of the drawing, are substantially circular and extend from a point in advance of the cylinder 1 to a point a

slight distance in the rear of the front edge of the cylinder, and the blades in the rear of the depressions are straight, as shown in Figure 4.

The reference numeral 1 indicates a cylinder open at both ends. The rounded projections 7 of the propeller blades project beyond the front open end of the cylinder and, as shown in the accompanying drawing, this cylinder is supported by being fixed to the peripheries of the propeller blades.

In practice I have demonstrated that with the propeller blades arranged as just described, in combination with the cylinder and when the shaft is rapidly rotated and the airplane or other vehicle to which it is applied is being advanced, then the forwardly projecting edges of the propeller blades will engage stationary air through which the propeller is being advanced. This air, in passing through the cylinder, will be acted upon in such manner that air will be compressed against the conic propeller blade and that this pressure will be greater at the rear than at the front of the cylinder, thereby increasing the amount of advance thrust of the propeller.

I have also provided a means for controlling the passage of air through the cylinder without stopping the rotation of the propeller blades. This comprises a hub 10 slidingly mounted on the sleeve 13, and a collar 8 which is held against rotation as hereinafter explained. Fixed at one end to the hub 10 are two spiral conical springs 11 and 15 made of flat metal. They are extended forwardly and outwardly to points in engagement with the rear end of the propeller blade 2, and rotate with the propeller blade. The construction and arrangement of the springs 11 and 15 is such that they normally hold the hub 10 at its rearward limit of movement, and the spaces between the coils is sufficient to permit air from the propeller to pass freely through said spaces. When the hub 10 is moved forwardly the spaces between the coils are narrowed and when the hub 10 is at its forward limit the spaces are closed and the passage of air rearwardly through the cylinder is prevented.

For controlling the movement of the closure springs I have provided two extension arms 18 connected with the lugs 12 fixed to the collar 8. These arms are slidingly mounted in the sleeves 19 and these extension arms may be jointly moved forwardly and rearwardly by manually operated means not shown. The stationary sleeves 19 serve the purpose to prevent the twisting of the arms 18. In this manner the housing 8 is prevented to rotate. However, it may slide

forth and back during the manipulation of the control. In practice with this control device I have demonstrated that when the control device is in its open position, as shown in Figure 1, it will not offer any appreciable resistance to the passage of air rearwardly through the cylinder and, hence, will not appreciably reduce the amount of forward thrust caused by the rotation of the propeller. I have, however, found in this connection that the sound waves caused by the rapid rotation of the propeller within the cylinder will, as they are passed rearwardly through the cylinder, be, to a considerable extent, broken up by the control device when open, and that the noise is thereby substantially decreased. This is due to a considerable extent to the fact that the spring control device rotates with the propeller.

One instance in which my improved control device is of great advantage is that when the propeller is used for propelling an airplane or the like, and it is desired to land upon a landing field of restricted area, the operator may, without stopping the rotation of the propeller or the engine, manually operate the closure device to wholly or partially stop the flow of air through the cylinder. When fully closed the entire area of the front end of the cylinder forms a resisting body which operates rapidly and effectively to retard the speed of the airplane, and the operator may, by manipulating the closure device, retard the speed of the airplane as much or as little as may be desired, and in the event that the operator should retard it too much, the operator can instantly open the control device and immediately accelerate the speed of the airplane. By this means the operator has much greater control of an airplane in landing than is possible with the present method of controlling the speed of the propeller blades, and the operator is thereby enabled to land safely upon a much smaller landing field than is possible with the propellers now in common use.

I claim as my invention:

1. An air propeller, comprising a rotatable shaft, a series of propeller blades operatively connected to the shaft and extended spirally around

the shaft, the bodies of the blades being inclined outwardly and forwardly, and a cylinder surrounding the blades and closely fitted thereto, and a means for manually controlling the thrust of the propeller, comprising a series of substantially flat springs arranged in spiral conical formation, their forward ends being in engagement with said blades and their rear ends slidingly supported on said shaft, the spirals of said springs being arranged in planes parallel to the planes of said blades and the spirals of the springs being normally spaced apart far enough to permit substantially uninterrupted passage of air rearwardly through the cylinder, and the spirals of said springs being also so arranged that when their rear ends are moved forwardly the spaces between the springs will be approximately closed to prevent the passage of air rearwardly from the propeller and thereby reduce the thrust of the propeller without reducing its speed.

2. An air propeller, comprising a rotatable shaft, a series of propeller blades operatively connected to the shaft and extended spirally around the shaft, the bodies of the blades being inclined outwardly and forwardly, and a cylinder surrounding the blades and closely fitted thereto, a means for manually controlling the thrust of the propeller, comprising a series of substantially flat springs arranged in spiral conical formation, their forward ends being in engagement with said blades and their rear ends slidingly supported on said shaft, the spirals of said springs being arranged in planes parallel to the planes of said blades and the spirals of the springs being normally spaced apart far enough to permit substantially uninterrupted passage of air rearwardly through the cylinder, and the spirals of said springs being also so arranged that when their rear ends are moved forwardly the spaces between the springs will be approximately closed to prevent the passage of air rearwardly from the propeller and thereby reduce the thrust of the propeller without reducing its speed, and means for slidingly supporting said springs upon said shaft.

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