Nov. 2, 1943. E. J. PRUCHA 2,333,555

SILENT PROPELLER

Filed Oct. 22, 1941 2 Sheets-Sheet 1

Fig. 1.

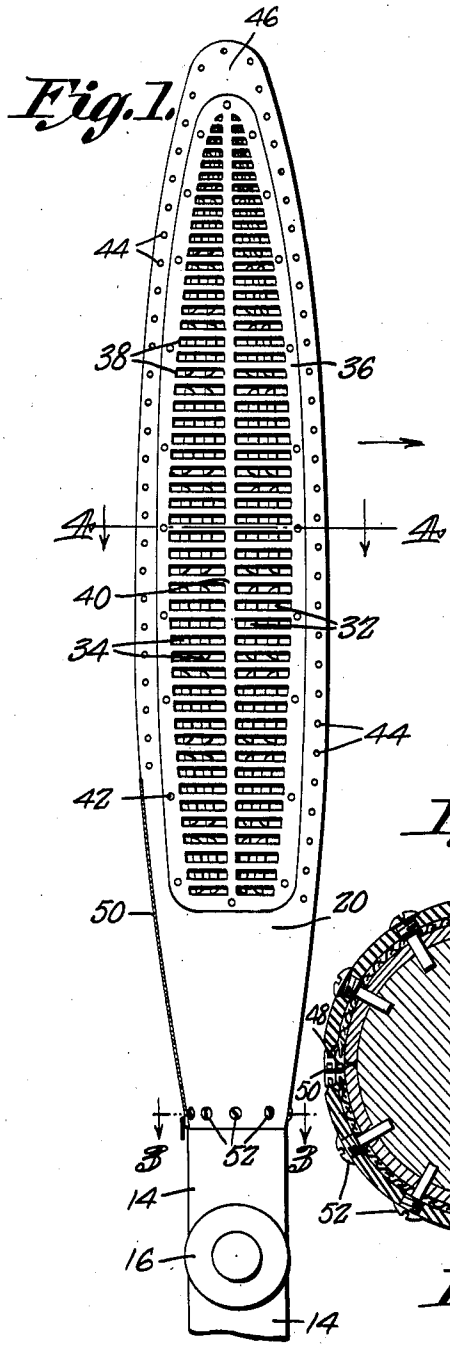


Fig. 2.

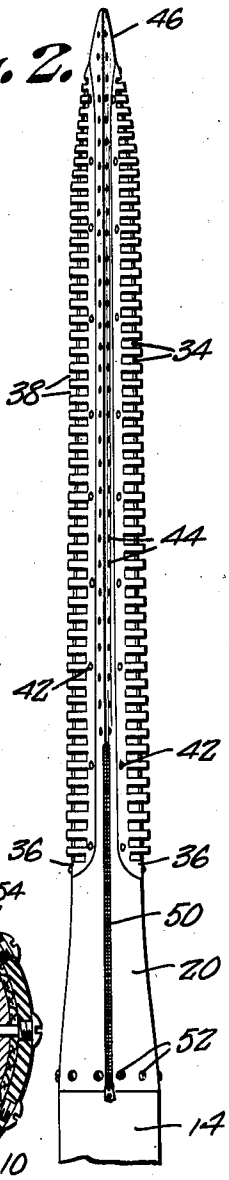
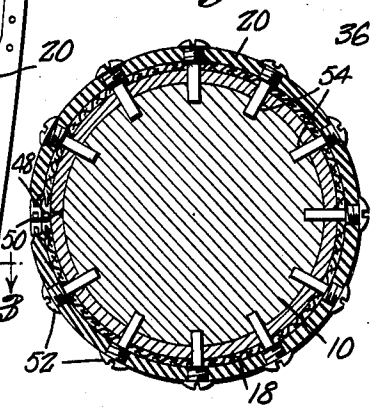


Fig. 3.



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Fig. 4.

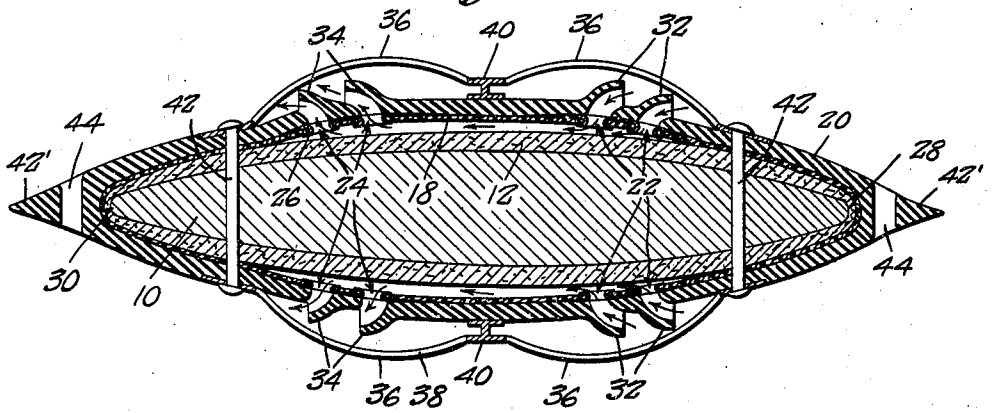
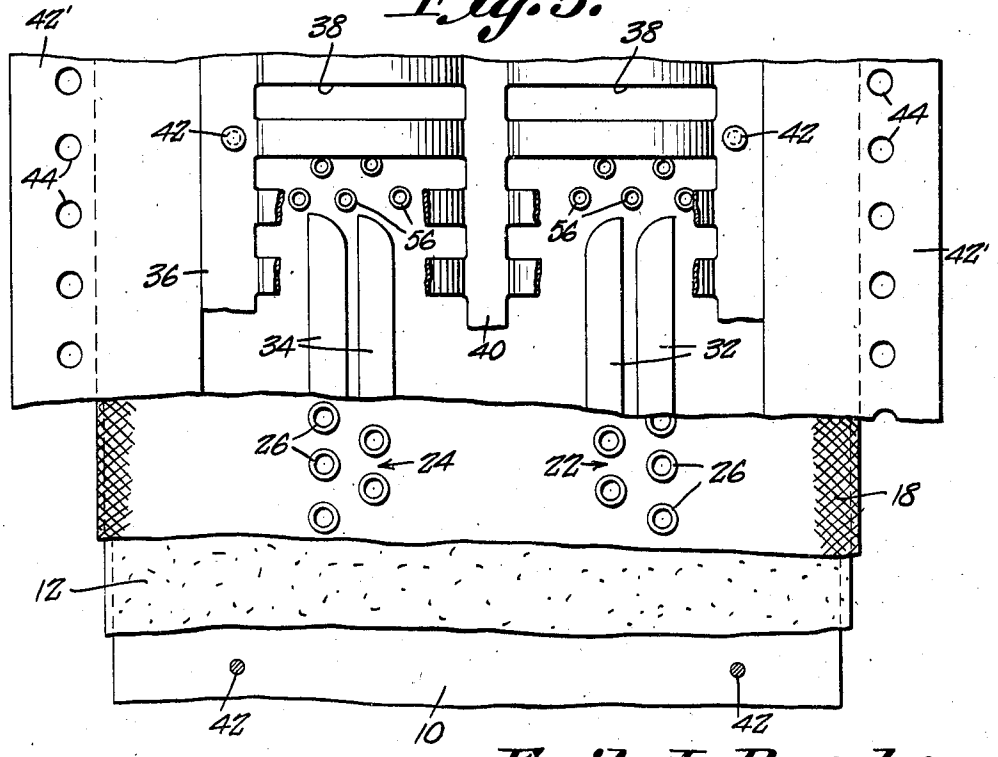


Fig. 5.



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UNITED STATES PATENT OFFICE

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SILENT PROPELLER

Emil John Prucha, Convent Station, N. J.

Application October 22, 1941, Serial No. 416,117

7 Claims. (Cl. 170—172)

My invention relates to aircraft and has among its objects and advantages the provision of an improved propeller blade designed to eliminate the whirring noises peculiar to the rotating propeller.

In the accompanying drawings:

Figure 1 is a view of a propeller blade in accordance with my invention;

Figure 2 is a view of the trailing edge of the blade;

Figure 3 is a sectional view taken along the line 3—3 of Figure 1;

Figure 4 is a sectional view taken along the line 4—4 of Figure 1; and

Figure 5 is an enlarged plan view of a portion of the blade.

In the embodiment selected for illustration, I make use of a conventional propeller blade 10 enclosed in a covering 12 of sponge rubber. The entire blade 10 is enclosed in the covering 12, with the exception of the shank 14 adjacent the hub 16. Outside the covering 12 is provided a canvas covering 18, which canvas covering completely encloses the sponge rubber covering 12. Enclosing the canvas covering 18 is an outside covering 20 of semi-hard rubber. Rubber covering 20 completely encloses the canvas covering 18.

Extending longitudinally of the blade 10 upon both its sides are two rows 22 and 24 of metallic eyelets or grommets 26 in the canvas covering 18. The rows 22 are spaced from the leading edge 28 of the blade 10 equal distances. The rows 24 are also spaced equal distances from the trailing edge 30 and at distances corresponding to the spacing between the rows 22 and the leading edge 28.

Rows of louvers 32 are formed in the rubber covering 20 in alignment with the eyelets 26 in the rows 22. Similar louvers 34 are formed in the rubber covering 20 in alignment with the eyelets 26 of the rows 24. Louvers 32 open toward the leading edge 28 of the blade 10, while the louvers 34 open in the direction of the trailing edge 30.

Extending over the louvers 32 and 34 on both sides of the propeller blade 10 are aluminium sheets 36, each provided with two rows of slots 38. Both sheets belly outwardly over the respective rows of louvers 32 and 34 and the longitudinal center areas of the two sheets are reinforced by I beams 40 secured to the rubber covering 20. The marginal edges of the two aluminium sheets 36 are fixedly secured to the rubber covering 20 by rivets 42 extending through the blade 10. The rubber covering 20 is depressed throughout the areas engaged by the margins of the aluminium sheets 36 so as to bring the outer surfaces of the latter flush with the surrounding rubber covering.

The leading and trailing edges of the rubber covering 20 terminate in wedge formations 42', each of which is provided with closely spaced transverse openings 44, which openings are also provided in the tip margin 46 of the rubber covering. Both the canvas covering 18 and rubber covering 20 are provided with zipper fastenings 48 and 50 extending from the length 14 partially along the trailing edge 30 of the blade 10. Screws 52 extend through the sponge rubber covering 12, the canvas covering 18 and the rubber covering 20 at their ends about the shank 14, which screws are threaded into the rubber covering and extended into bores 54 in the shank 14. The louvers in the respective rows 32 and 34 are slightly spaced end to end, and the rubber covering 20 throughout the areas between the spaced louvers are provided with metallic eyelets 56 which operate to cushion the louvers.

In operation, air trapped in the leading rows of louvers 32 passes through the eyelets 26 and between the sponge rubber covering 12 and the canvas 18, the air exhausting through the eyelets 26 associated with the rows of trailing louvers 34. The I beams 40 engage the rubber covering 20 to restrain the covering from bellying in an excessive degree from the covering 12.

The bellied formation of the aluminium sheets 36, when viewed according to Figure 4, provides an element of resiliency or cushioning characteristics accommodating a predetermined degree of expansion of the rubber covering. When the blade 10 is stationary, the rubber covering 20 firmly engages the canvas covering 14 and presses the latter against the sponge rubber covering 12 throughout its entire outer surface. The openings 44 in the wedge formations 42 break down the stiffness of these formations so as to lend cushioning properties thereto.

Without further elaboration, the foregoing will so fully illustrate my invention, that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. The combination of a propeller blade, a resilient covering for the blade, a second covering enclosing the resilient covering and being provided with a row of air inlet openings extending longitudinally of the blade on one side thereof and a row of air outlet openings extending longitudinally of the blade rearwardly of said first mentioned row and on the same side of the blade,

and a resilient covering over said second covering and provided with air inlet louvers and air outlet louvers respectively aligned with said air inlet openings and said air outlet openings.

2. The invention described in claim 1 wherein all of said coverings are riveted to the blade about its peripheral portion.

3. The invention described in claim 1 wherein said semi-resilient covering includes wedge shaped formations about the peripheral portions of the blade and in the plane of the blade.

4. The invention described in claim 1 wherein said resilient covering comprises sponge rubber, said second covering comprises canvas and said semi-resilient covering comprises rubber.

5. The invention described in claim 1 wherein fastening pins are provided for all the coverings about the shank of the blade, and in which said second covering and said semi-resilient covering are provided with slide fasteners extending partially along the trailing edge of the blade.

6. The invention described in claim 1 wherein said air inlet openings and said air outlet openings and said air inlet louvers and the outlet louvers are provided on both front and rear faces of the blade.

7. The invention described in claim 1 wherein said air inlet openings and air outlet openings and said air inlet louvers and the outlet louvers are provided on both front and rear faces of the blade, slotted metallic sheets extending over the air inlet and air outlet louvers and fixedly secured to the blade, said metallic sheets being bellied outwardly over the respective air inlet and air outlet louvers and engaging said semi-resilient covering along lines between the respective rows of air inlet and air outlet louvers.

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