May 8, 1923. 1,454,356

E. L. WALKER

PROPELLER

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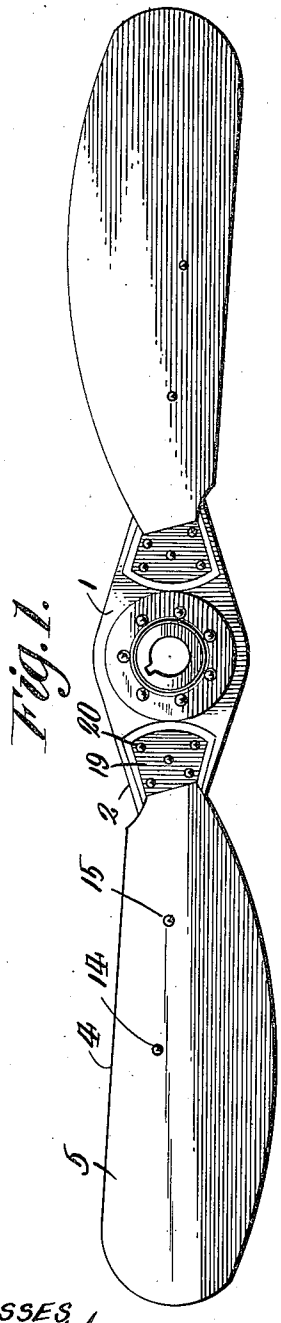


Fig. 1.

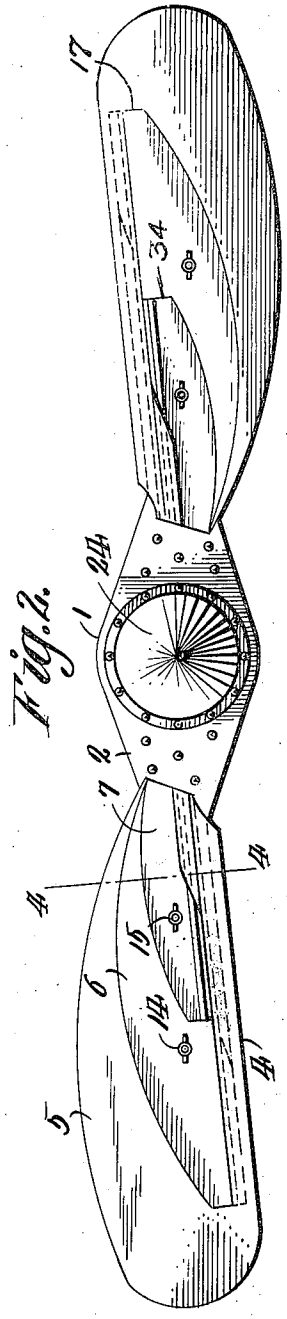


Fig. 2.

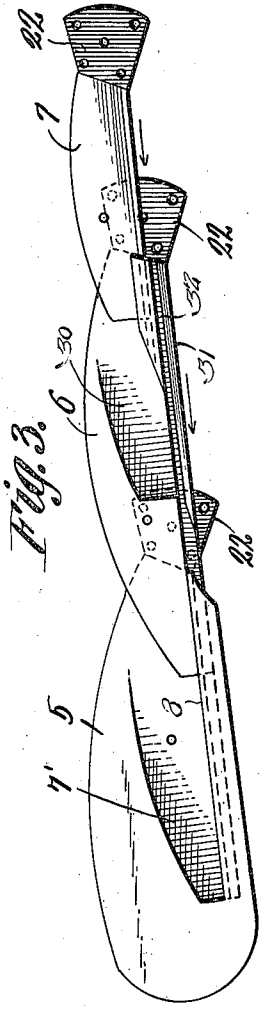


Fig. 3.

WITNESSES
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Fig. 4.

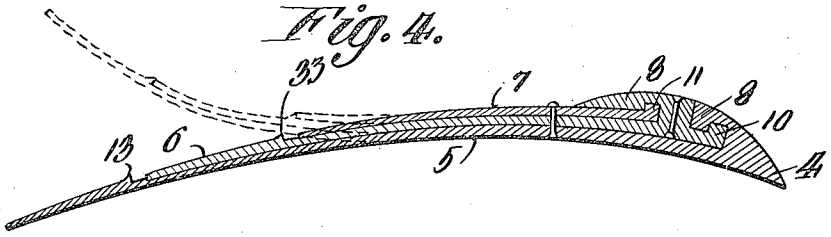


Fig. 5.

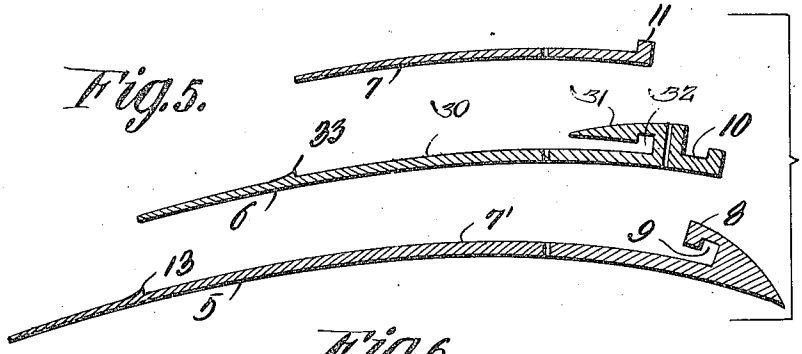


Fig. 6.

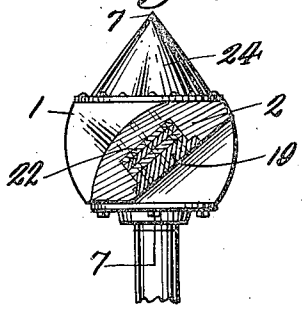
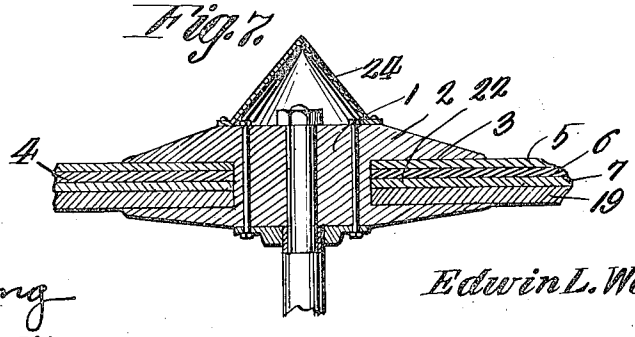


Fig. 7.



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PROPELLER

Filed Feb. 13, 1922 3 Sheets-Sheet 3

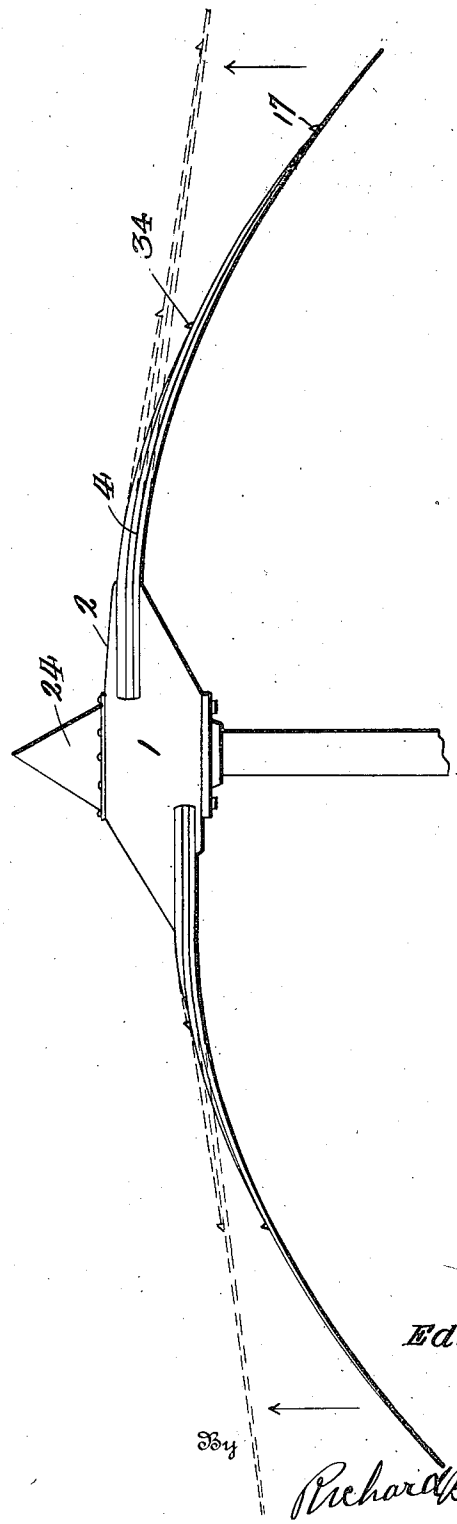


Fig. 8.

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UNITED STATES PATENT OFFICE.

EDWIN L. WALKER, OF ONAWAY, MICHIGAN.

PROPELLER.

Application filed February 13, 1922. Serial No. 536,224.

To all whom it may concern:

Be it known that I, EDWIN L. WALKER, a citizen of the United States, residing at Onaway, in the county of Presque Isle and State of Michigan, have invented certain new and useful Improvements in a Propeller, of which the following is a specification.

This invention relates to a propeller especially designed for use with aeroplanes and the like and has for its principal object to provide a device of this nature which is provided with blades that are flexible both longitudinally and transversely, thereby affording more efficient operation of the propeller and attaining more pulling or pushing power therefrom.

Another object of the invention is to generally improve upon propellers of this nature by providing a device which is extremely simple in construction, efficient in operation, durable, and well adapted to the purpose for which it is designed.

With the above and numerous other objects in view as will appear as the description progresses, the invention relates to certain novel features of construction, and the combination and arrangement of parts as will be hereinafter more fully described and claimed.

In the drawing:—

Figure 1 is a plan of the propeller,

Figure 2 is a similar view taken from the opposite side from that shown in Figure 1.

Figure 3 is a plan view of one blade showing the laminations thereof partly separated,

Figure 4 is a transverse section taken through one of the blades approximately on the line 4—4 of Figure 2,

Figure 5 is a transverse view through the laminations of one blade showing the same separated,

Figure 6 is a transverse section taken through the body portion of the propeller,

Figure 7 is a longitudinal section taken therethrough approximately on the line 7—7 of Figure 6, and

Figure 8 is a diagrammatic view indicating the propeller in edge elevation.

Referring to the drawing in detail it will be seen that 1 designates the body portion of the propeller which in the present illustration of the invention is provided with a pair of diametrically opposed arms 2 having suitable pockets 3 formed therein for receiving the blades indicated generally at 4. Each blade comprises a plurality of laminations superimposed upon each other and these laminations are preferably formed of some resilient and flexible material such as spring steel. In the present illustration of my invention I have shown three laminations including the main lamination 5, the intermediate lamination 6 and the small lamination 7. The main lamination 5 forms the body of the blade and is provided with a pocket 7′ and an over-hanging ledge 8 which is provided with a groove 9. The intermediate lamination 6 is provided with a pocket 30 and an over-hanging ledge 31 which is provided with the groove 32. The intermediate lamination 6, however, is provided adjacent its cutting edge with a groove 10 for receiving the ledge 8 of the main lamination 5. The small lamination 7 is provided at its cutting edge with a ridge or raised portion 11 which is adapted to slide in the groove 32 of the intermediate lamination 6. The non-cutting edges of these laminations 5, 6 and 7 are comparatively thin and 33 are provided adjacent the non-cut- edge of a bird's wing. The shoulders 13 and 33 are provided adjacent the non-cutting edges on the laminations 5 and 6 and the end of the pockets 7′ and 30 thereof so as to limit the transverse flexibility of the blade as is illustrated in dotted lines in Figure 4. The full line illustration in Figure 4 represents the normal position of the blade. These laminations are assembled by sliding the intermediate lamination in the pocket 7′ of the main lamination 5 from its inner end and the small lamination 7 is then slid in the pocket 30 of the intermediate lamination 6 and the parts may be suitably bolted together as at 14 and 15. As is illustrated to advantage in Figure 8 this construction allows the blades to flex longitudinally, since the parts are capable of sliding to a limited extent in relation to each other and because the laminations are formed of some flexible material as previously indicated. This longitudinal flexing of the blades 4 is limited by the shoulders 17 and 34 formed at the ends of the pockets 7′ and 30 in the laminations 5 and 6. The inner ends of the blades 4 are positioned in the pockets 3 of the arms 2 and a plate 19 is placed thereover and suitable rivets 20 are passed through the plates laminations and arms so as to securely hold these parts together. These pockets are preferably formed substantially dove-tail so as to conform to

the dove tailed shaped ends 22 of the various laminations as is illustrated to advantage in Figure 3.

On the face of the body 1 opposite that which is flush with the plate 19 I have provided a cone-shaped anti-resistance shield 24 which is suitably riveted to the central portion of the body 1 and aids in cutting the air.

It is thought that the operation and advantages of the invention will now be clearly understood without a more detailed description thereof. It is to be noted, however, that I have illustrated the invention in one embodiment only and particularly with a pulling propeller, and it is to be understood that the same principle may be used in a pushing propeller with only minute changes in construction. I, therefore, desire to reserve the right to make such changes as may fall within the scope of the appended claims.

Having thus described my invention what I claim as new is:—

1. A propeller of the class described including a body portion and a plurality of blades carried thereby, said blades being flexible both longitudinally and transversely.

2. In combination, a body portion, a plurality of blades attached to the body portion, each blade formed of a plurality of flexible laminations engaged with one another along one longitudinal edge.

3. In combination, a body portion, a plurality of blades attached to the body portion, each blade including a plurality of superimposed laminations capable of sliding in relation to each other both transversely and longitudinaly so as to allow the blade to flex both transversely and longitudinally in the manner and for the purpose specified.

4. In combination, a body portion, a plurality of blades carried by said body portion, each blade including a plurality of superimposed laminations, means at one longitudinal edge of each blade for holding the laminations together and allowing the same to flex longitudinally and transversely in relation to each other.

5. In combination, a body portion, a plurality of blades attached to the body portion, each blade including a plurality of laminations some of which are provided with pockets for receiving the superimposed lamination thereon.

6. In combination, a body portion, a plurality of blades attached to the body portion, each blade including a plurality of laminations some of which are provided with pockets for receiving the superimposed lamination thereon, and grooved ledges extending over said pockets, and ridges formed on the laminations in said pockets for engagement with said grooved ledges.

7. As a new article of manufacture, a blade for a propeller including a plurality of laminations superimposed upon one another and capable of flexing both longitudinally and transversely.

8. As a new article of manufacture, a blade for propellers including a plurality of laminations joined along one longitudinal edge so as to be capable of flexing both longitudinally and transversely.

9. As a new article of manufacture, a blade for propellers including a plurality of superimposed flexible laminations each of which tapers from one longitudinal edge to the other longitudinal edge, the thicker longitudinal edges being disposed adjacent to each other so that the blade tapers transversely.

10. As a new article of manufacture, a blade for a propeller including a plurality of superimposed flexible laminations each of which tapers transversely, the thicker longitudinal edges of the laminations being disposed adjacent each other so that the blade tapers transversely and means for engaging the thicker longitudinal edges of the laminations with one another so that the laminations may flex longitudinally in relation to one another.

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

EDWIN L. WALKER.

Witnesses:
VICTOR VERBECK,
JEAN MCLEOD.