Aug. 23, 1932. J. KARAGEORGE 1,872,749

FAN BLADE

Filed Dec. 6, 1930 2 Sheets-Sheet 1

Fig. 1.

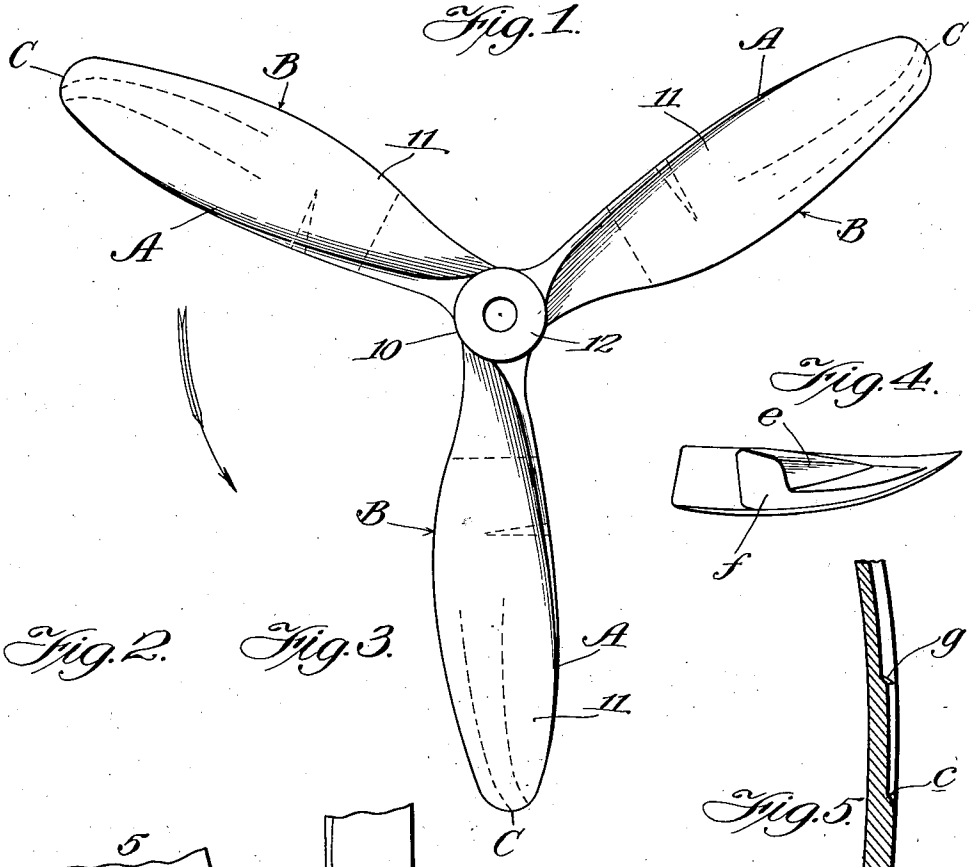


Fig. 2.

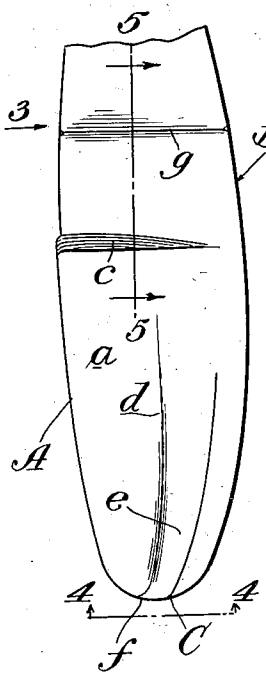


Fig. 3.

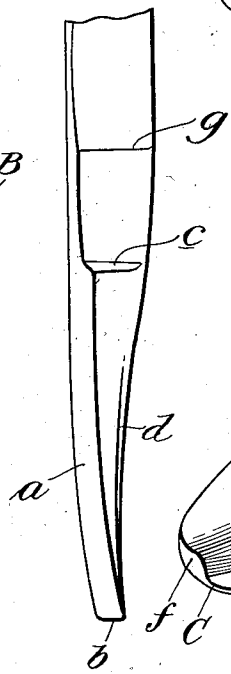
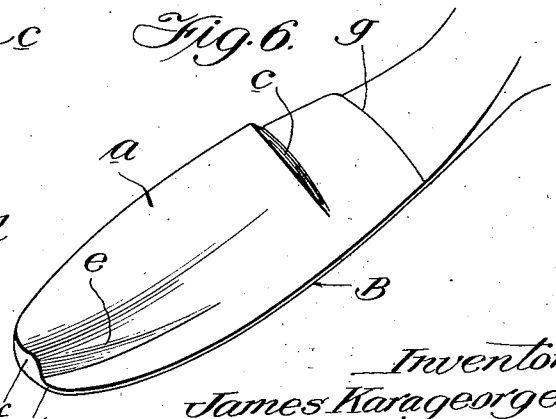


Fig. 4.

Fig. 5.

Fig. 6.



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FAN BLADE

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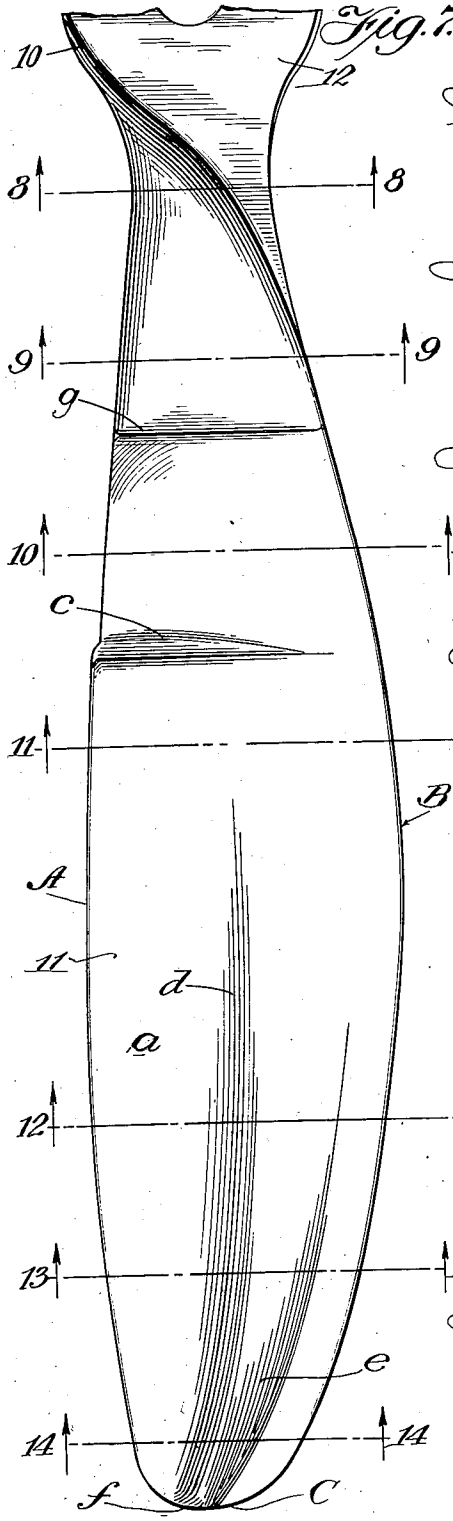


Fig. 7.

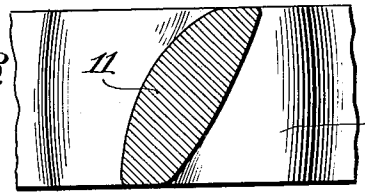


Fig. 8.

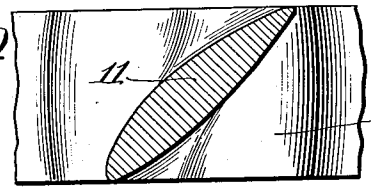


Fig. 9.

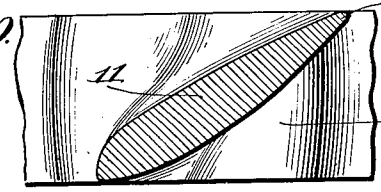


Fig. 10.

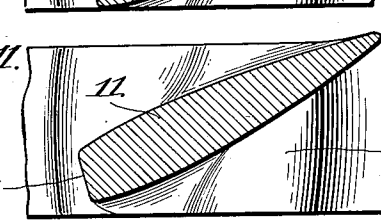


Fig. 11.

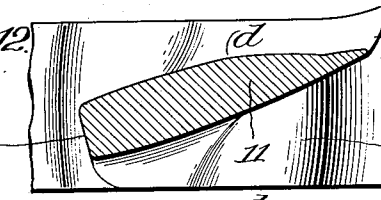


Fig. 12.

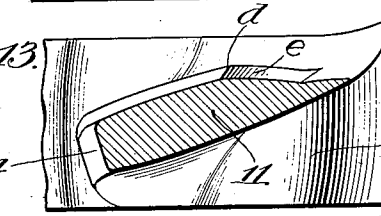


Fig. 13.



Fig. 14.

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Patented Aug. 23, 1932 1,872,749

UNITED STATES PATENT OFFICE

JAMES KARAGEORGE, OF CHICAGO, ILLINOIS

FAN BLADE

Application filed December 6, 1930. Serial No. 500,444.

This invention relates to improvements in propellers more particularly designed for use as fans for the displacement and propulsion of air for ventilation and the like, as in restaurants, halls and other places, and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

Fans of the kind, with blades of simple screw propeller type, have been used heretofore for the purpose mentioned, but when made of large diameter for displacing great quantities of air, they operate with a loud, noisy hum and are objectionable for use for that reason, disturbing those located even at some distance from the fan, and those who are more nearly in its neighborhood to a greater degree.

The object of my invention is to produce a fan blade so designed and constructed on its active, air or other fluid displacing face, that the usual loud hum developed in the rapid rotation of such a fan is reduced to a minimum and a fan with my improved blade runs so quietly that even in comparatively small rooms, the sound of its running is barely noticeable even in the near vicinity of the fan. As a result, the number of blades may be increased, that is to say, instead of the usual two diametrically disposed blades ordinarily employed in such fans, three or even four blades may be used without materially increasing the hum of the fan, so that a fan for greater movement or displacement of air may be employed advantageously and with little of the noisy hum that would be had with prior fans of the kind.

The advantages of my invention will appear more fully as I proceed with my specification.

In the drawings:—

Figure 1 is a view representing a fan with three blades provided with my improvement, the elevation being such as when viewed from the rear faces of the blades, that is to say, the inactive faces of the blades.

Figure 2 is an elevation of the active face of one of the blades.

Figure 3 is a view of the blade as seen when looked at in the direction of the arrow 3 in Figure 2.

Figure 4 is an end view of the blade.

Figure 5 is a partial section through the blade in a plane indicated by the line 5—5 of Figure 2.

Figure 6 is a perspective view of a part of the blade.

Figure 7 is a rear elevation of the blade substantially to scale and of the normal dimensions of the blade.

Figures 8 to 14, inclusive, are transverse sections of the blade in planes indicated, respectively, in Figure 7 by the lines 8—8 to 14—14, respectively.

The blade in its main aspect is of the familiar type of screw propeller blade with a pitch suitable for the discharge or displacement of the designed and intended amount of air and with its inactive face the same as that of such blade. The improvement lies in the contour of the active face, which is different from that of prior blades of the kind in the respects now to be pointed out.

In the drawings:—10 indicates the propeller as a whole, which in this case is provided with three blades 11, 11 fixed to the hub 12. The propeller, as shown in Figure 1, is designed to rotate counterclockwise in the direction of the arrow. A indicates the leading or cutting edge of the blade and B indicates the following edge of the blade. Throughout a little more than half of the length of the blade from the tip C towards the hub 12 the leading or cutting edge A is made thicker than blades of the kind, said thickness being about twice the thickness of the blade adjacent its following edge. Said thicker part is indicated at *a* and runs from the tip C of the blade a little more than half of the length of the blade towards the hub, terminating in a transverse shoulder indicated at *c*. Said thicker part of the blade continues substantially uniform in thickness laterally of the blade from the cutting edge to a longitudinal median line of the blade, as indicated at *d*, beyond which said thickness is gradually reduced towards the following edge B of the blade. Towards the tip C of the blade the reduction in thickness

is made more and more abrupt with the result that a longitudinally extending, laterally rounded shoulder *e* is produced, said shoulder being wider at the tip of the blade, as indicated at *f* and tapering towards the hub to disappear at a point somewhat beyond or about half way from the tip of the blade to the transverse shoulder *c*.

The leading or cutting edge A of the blade, as shown, is flat rather than rounded, the blade being along said edge of substantially uniform thickness almost to the plane of that edge. Beyond the transverse shoulder *c* in the direction towards the hub 12 of the propeller is preferably a second transverse shoulder *g*.

Without stating a theory of the reasons therefor, it appears that in the operation of a fan with my improved blade, the air displaced by the blade between the shoulders *c*, *g*, and the hub is somewhat reduced in volume in the cylindrical space described by said shoulders in the rotation of the fan. The greater part of the displacement of air is produced by the part of the blade radially beyond the shoulder *c*. In any case and for whatever reason, I have found that a propeller with blades having the active surface and cutting edge formed as described and illustrated, operates with a minimum of noise or hum as compared to ordinary screw propeller blades of the kind as heretofore designed.

I claim as my invention:—

1. A propeller blade of the screw propeller type, said blade being substantially thickened along its leading edge as compared to its thickness along its following edge, said thickened part extending from the tip of the blade to a point intermediate its ends where it terminates in a reducing shoulder extending transversely of the blade, said thickened part continuing laterally to a longitudinal median line of the blade beyond which it is gradually reduced towards the following edge of the blade, said thickness being reduced with increasing abruptness towards the tip of the blade towards which the leading and following edges converge, thus forming a longitudinally extending transversely inclined shoulder extending inwardly from the tip of the blade, said shoulder tapering towards the inner end of the blade and disappearing at a point intermediate said tip and said transverse shoulder.

2. A propeller blade of the screw propeller type, said blade being substantially thickened along its leading edge as compared to its thickness along its following edge, said thickened part extending from the tip of the blade to a point intermediate its ends where it terminates in a reducing shoulder extending transversely of the blade, said thickened part continuing laterally to a longitudinal median line of the blade beyond which it is gradually reduced towards the following edge of the blade, said thickness being reduced with increasing abruptness towards the tip of the blade towards which the leading and following edges converge, thus forming a longitudinally extending transversely inclined shoulder extending inwardly from the tip of the blade, said shoulder tapering towards the inner end of the blade and disappearing at a point intermediate said tip and said transverse shoulder, and said blade being still further reduced in thickness by a transverse shoulder spaced radially within said first named transverse shoulder.

3. A propeller blade of the screw propeller type, said blade being substantially thickened along its leading edge (which is flat and blunt) as compared to its thickness along its following edge, said thickened part extending from the tip of the blade to a point intermediate its ends where it terminates in a reducing shoulder extending transversely of the blade, said thickened part continuing laterally to a longitudinal median line of the blade beyond which it is gradually reduced towards the following edge of the blade, said thickness being reduced with increasing abruptness towards the tip of the blade towards which the leading and following edges converge, thus forming a longitudinally extending transversely inclined shoulder extending inwardly from the tip of the blade, said shoulder tapering towards the inner end of the blade and disappearing at a point intermediate said tip and said transverse shoulder.

4. A propeller blade of the screw propeller type, said blade being substantially thickened along its leading edge (which is flat and blunt) as compared to its thickness along its following edge, said thickened part extending from the tip of the blade to a point intermediate its ends where it terminates in a reducing shoulder extending transversely of the blade, said thickened part continuing laterally to a longitudinal median line of the blade beyond which it is gradually reduced towards the following edge of the blade, said thickness being reduced with increasing abruptness towards the tip of the blade towards which the leading and following edges converge, thus forming a longitudinally extending transversely inclined shoulder extending inwardly from the tip of the blade, said shoulder tapering towards the inner end of the blade and disappearing at a point intermediate said tip and said transverse shoulder, and said blade being still further reduced in thickness by a transverse shoulder spaced radially within said first named transverse shoulder.

5. A propeller blade of the screw propeller type, said blade being substantially thickened along its leading edge as compared to its thickness along its following edge, said

thickened part extending from the tip of the blade to a point somewhat more than half its length where it terminates in a reducing shoulder extending transversely of the blade, said thickened part continuing laterally to a longitudinal median line of the blade beyond which it is gradually reduced towards the following edge of the blade, said thickness being reduced with increasing abruptness towards the tip of the blade towards which the leading and following edges converge, thus forming a longitudinally extending transversely inclined shoulder extending inwardly from the tip of the blade, said shoulder tapering towards the inner end of the blade.

6. A propeller blade of the screw propeller type, said blade being substantially thickened along its leading edge as compared to its thickness along its following edge, said thickened part extending from the tip of the blade to a point somewhat more than half its length where it terminates in a reducing shoulder extending transversely of the blade, said thickened part continuing laterally to a longitudinal median line of the blade beyond which it is gradually reduced towards the following edge of the blade, said thickness being reduced with increasing abruptness towards the tip of the blade towards which the leading and following edges converge, thus forming a longitudinally extending transversely inclined shoulder extending inwardly from the tip of the blade, said shoulder tapering towards the inner end of the blade and disappearing at a point intermediate said tip and said transverse shoulder.

In testimony that I claim the foregoing as my invention, I affix my signature this 2nd day of December, A. D. 1930.

JAMES KARAGEORGE.