(No Model.)

G. M. & E. A. HOYLAND.

PROPELLER.

No. 562,469. Patented June 23, 1896.

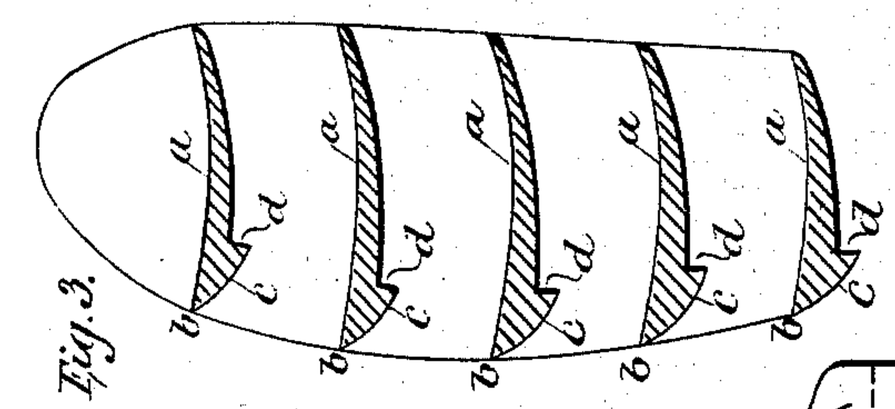

Fig. 3.

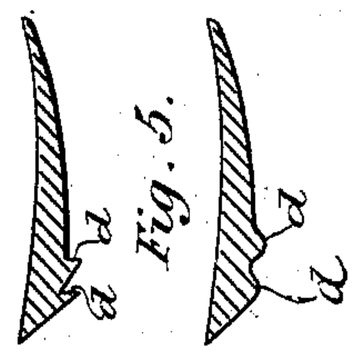

Fig. 4.

Fig. 5.

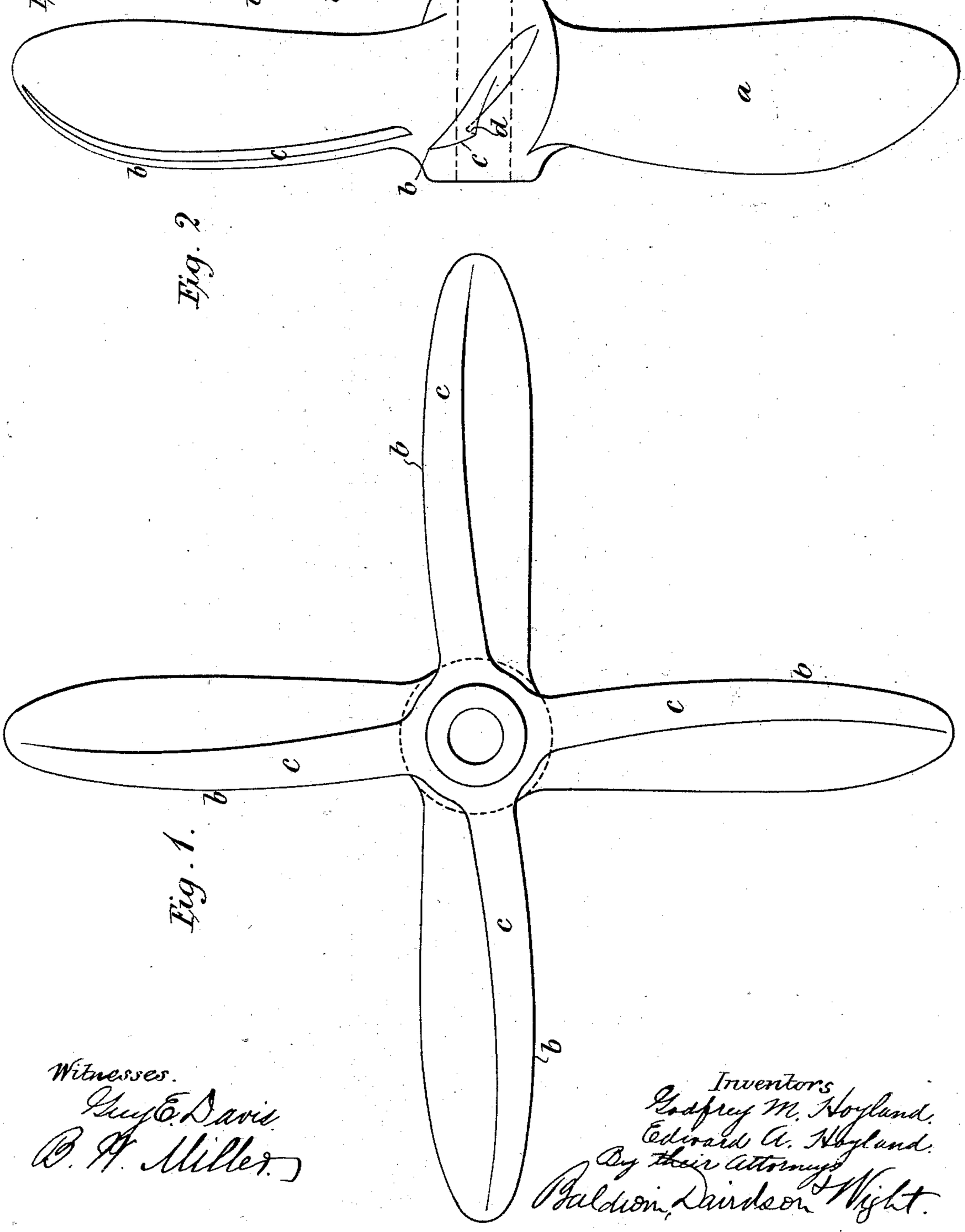

Fig. 2

Fig. 1.

Witnesses.
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UNITED STATES PATENT OFFICE.

GODFREY MAINWARING HOYLAND AND EDWARD ALGERNON HOYLAND,
OF LONDON, ENGLAND.

PROPELLER.

SPECIFICATION forming part of Letters Patent No. 562,469, dated June 23, 1896.

Application filed November 30, 1895. Serial No. 670,671. (No model.) Patented in England October 5, 1894, No. 18,943; in France January 18, 1895, No. 244,431, and in Germany January 22, 1895, No. 82,803.

To all whom it may concern:

Be it known that we, GODFREY MAINWARING HOYLAND and EDWARD ALGERNON HOYLAND, ship-owners, subjects of the Queen of Great Britain, residing at 8 and 9 Great St. Helens, in the city of London, England, have invented certain new and useful Improvements in Propellers for Ships and Vessels, (for which we have obtained Letters Patent in Great Britain, No. 18,943, dated October 5, 1894; in France, No. 244,431, dated January 18, 1895, and in Germany, No. 82,803, dated January 22, 1895,) of which the following is a specification.

Our improved propeller is of the screw-propeller class; and it consists of blades set at a suitable inclination onto a boss to be fixed upon the propeller-shaft. These blades are concave on the after or propelling face, this surface being a portion of a cone, an ellipsoid, or a sphere, or it may be of a domed form; but the main feature of our invention is that on the back of the leading or cutting edge of the propeller-blade we make a wedge-like rib or thickening upon the reverse side of the cutting edge of the blade following the curve of the blade. This rib or thickening extends around the back of the blade for a short distance inward from the cutting edge, and then terminates in a more or less abrupt shoulder, the surface of the rib then, with a suitable curvature, falling down to and merging in that of the reverse side of the blade.

In order that our invention may be fully understood and readily carried into effect, we will proceed to describe the drawings annexed.

Figure 1 is a front elevation of a propeller in accordance with our invention. Fig. 2 is a side elevation of the same. Fig. 3 shows in outline the face of one of the blades and the sectional form at various points.

a marks the concavity on the principal driving-face of the blade; *b*, the cutting edge of the blade; *c*, the wedge-like rib or thickening upon the back or reverse of the blade; *d*, the shoulder in which the rib, after extending a distance inward from the cutting edge, terminates.

The propeller represented by the drawings is four-bladed, but this is not an essential feature. The number of blades may be varied and the dimensions of the propeller will be such as is best adapted to the ship or vessel to which it is intended to be fitted.

Although we prefer that the blades should be concave on the principal propelling-face, as shown in the drawings, nevertheless ribs such as *c* may with advantage be applied to blades which are not so formed.

In some cases we provide more than one rib *c* on the back or reverse of the blade. If more than one, the ribs run parallel the one to the other and each terminates in a shoulder *d*, as is shown in the transverse section, Fig. 4, or the ribs may have a wavy form, as in Fig. 5.

The reason which leads us to form propellers in the manner described is that by so forming them they are enabled to operate upon the frictional wake and to utilize its propulsive force.

The effect of the rib and hollow at the back of the blade is to alter the direction of the streams of water flowing in to supply the void left by the vessel in its onward course. These lateral streams are by the ridge diverted from their course and eddies are formed which check the flow and leave the water comparatively dead. The next blade strikes upon the dead water and experiences a more solid resistance than it would if the water were in rapid flow.

What we claim is—

1. A propeller-blade having an approximately radial rib or thickening *c*, provided with an abrupt shoulder *d* at its leading or cutting edge, and upon the reverse side of the blade, substantially as described.

2. A propeller-blade concave on the after or principal propelling-face, and having a wedge-like rib or thickening *c* shouldered at *d*, upon the reverse side of the blade, substantially as described.

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Witnesses:
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