

904,656.

C. STEIGER.
SCREW PROPELLER.
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Patented Nov. 24, 1908.

Fig. 1

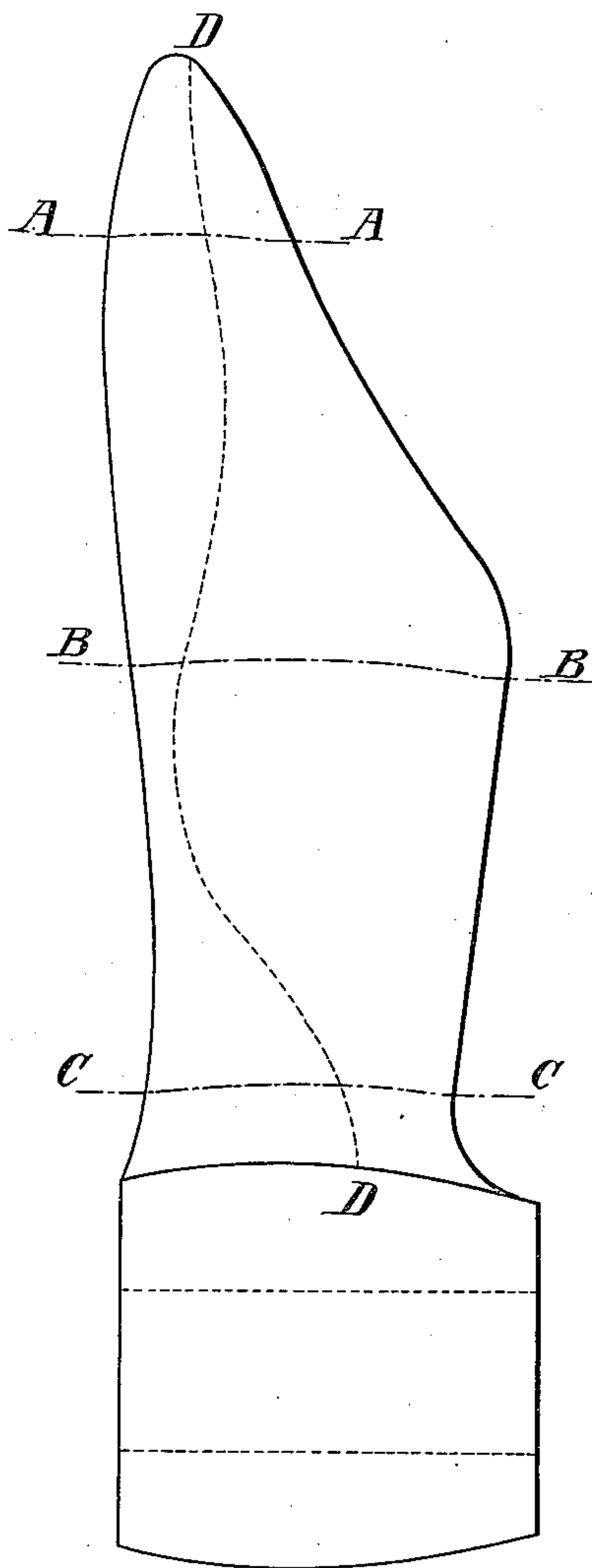
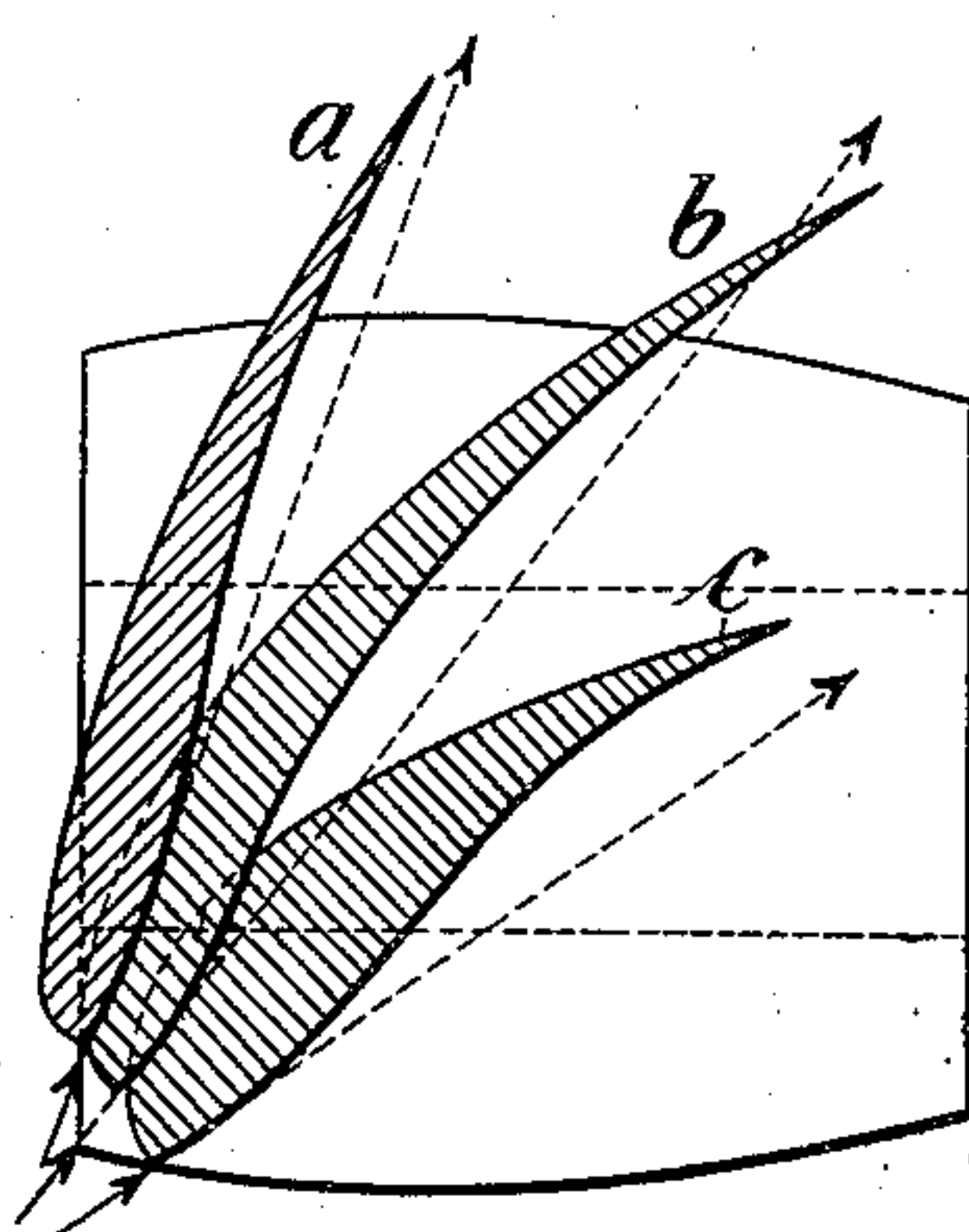


Fig. 2



WITNESSES:

W. H. Derrigan
John A. Hoving

INVENTOR,
CARL STEIGER,
by *Paul de Weert Schenk*
Attorneys.

UNITED STATES PATENT OFFICE.

CARL STEIGER, OF BENDLIKON, NEAR ZURICH, SWITZERLAND.

SCREW-PROPELLER.

No. 904,656.

Specification of Letters Patent. . . Patented Nov. 24, 1908.

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To all whom it may concern:

Be it known that I, CARL STEIGER, a citizen of Switzerland, residing and having a post-office address at Bendlikon, near Zurich, in the canton of Zurich, Republic of Switzerland, have invented certain new and useful Improvements in and Relating to Screw-Propellers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to screw propellers, the object being to provide a propeller of increased efficiency as compared with propellers hitherto in use, and one by which vibration is greatly reduced.

Each section of a propeller-blade, situated on a cylinder concentric to the propeller shaft, must have a certain thickness in proportion to its length. The more distant from the propeller shaft such a section is situated, the less may be this thickness. The question is, now, to find, for a certain strength of blade, the most favorable forms of the sections. The plurality of the propellers now in use are plane on the active or rear side of the blades and more or less convex on the front side.

By trials, carried out by the inventor, as well with floats in the water as with propellers on ships, it has been found that the efficiency of a propeller becomes better, if the rear sides of said sections are composed of a convex and a concave curve. But the proportion of the convex part to the concave part shall not be the same in all sections, but smallest about midway between the base and the point of the blade, while this proportion increases with the sections towards the base of the blade and towards the top of the blade. This result was found by trials, and forms the essential feature of the invention. It arises partly from the fact, that, in this form of section, the front side is less convex, as it were the case, in sections of the same area but with plane rear sides, and whereby great cavitations were produced.

Referring to the accompanying drawing: Figure 1 shows, in a side-elevation, one form of construction of a blade constructed according to the present invention. Fig. 2 shows three of these cylindrical sections, *a*, *b*,

c, concentric to the propeller shaft on the line A—A, B—B, C—C in Fig. 1, *i. e.* the horizontal parts of these lines indicate the foremost and hindmost points of the section. The curved portions of the lines indicate the projections of the inter-section lines between the corresponding section cylinders and the parts of the upper surface of the blade visible in these projections.

In the figures, the left side is the side of the propeller which is nearer the ship. The forward movement of the ship is effected when the propeller is rotated in an anti-clockwise direction as viewed from the rear. The back of the blade is, therefore, the working side. As may be seen from Fig. 2, on the working side, each of the cylindrical blade sections is bounded by a curve which consists of a concave and a convex part. The proportions, in length, between both these parts in the various sections is also various. Whereas in the section *c* the convex part considerably exceeds the concave part, in section *b*, however, the former forms only a small fractional part of the latter. In section *a*, the relation is again almost the same as in section *c*. Section *b* is distant from the base of the blade at about $\frac{1}{2}$ of the distance between this base and the top of the blade. It will be understood, however, that this section may be situated a little without or within or at the middle of said distance, without departing from the spirit of this invention. The curve D—D, in Fig. 2, connects all the points in which the concave parts of the boundary lines of the various sections pass over into the convex. The greatest thickness of each working blade cross-section is in its front third part, differing from the most screw blades in use up to the present, where the greatest thickness is in the middle of the breadth of the blade.

Experiments carried out by the inventor with "floats" in water have resulted, that with a certain strength of blade toward the front edge the blade action is not only better than when the greatest strength of the blade is situated in the middle of the breadth of the blade, but is more favorable than with a blade, which consists of only a uniformly thin sheet, furthermore that it is advantageous to allow the ends of the front and the back to meet at about a right angle. The blades should be as pointed as possible towards the back. Screw propellers provided with such blades have, according to trials

made by the inventor, the advantage, as compared with screw propellers in use up to the present, that they, with equal diameter, have a more powerful thrust and less slip and occasion less vibration of the vessel, and furthermore can be fitted to various kinds and sizes of ships and can also be used on ships running with high speed and as drag-screws.

10 What I claim is:

A screw propeller, in which the several cross sections of each blade concentric to the propeller axis are each composed of a

concave and a convex curve at the rear side of the blade, the proportion of the convex part to the concave part being smallest about midway between the base and the point of each blade and increasing towards the base of the blade and towards its point. 15

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses. 20

CARL STEIGER.

Witnesses:

HERMANN OUBER,
A. LIEBERKNECHT.