

(Model.)

ADOLF GRAF VON BUONACCORSI DI PISTOJA.

SCREW PROPELLER.

No. 296,271.

Patented Apr. 1, 1884.

Fig. I.

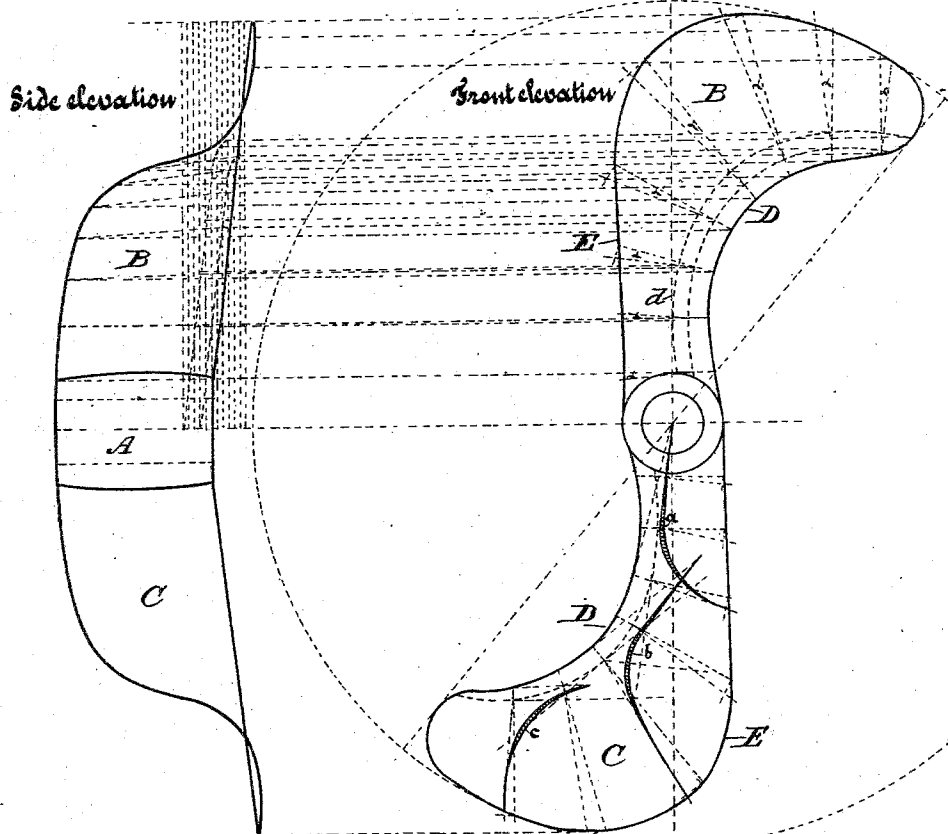
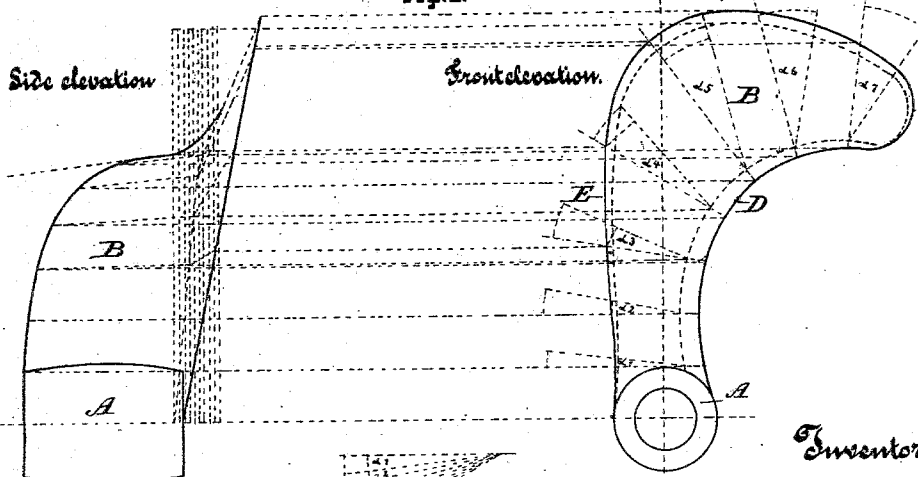


Fig. II.



Witnesses:

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SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 296,271, dated April 1, 1884.

Application filed October 31, 1882. (Model.)

To all whom it may concern:

Be it known that I, ADOLF GRAF VON BUONACCORSI DI PISTOJA, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Empire of Austria-Hungary, have invented certain new and useful improvements in Propellers, of which the following is a specification.

My invention relates to improvements in screw-propellers; and the object is to provide a screw propeller that is more effective in its operation, and to obtain a better result with the expenditure of less power in proportion to the work accomplished.

The invention consists in constructing a propeller by the combination of a series of parabolic curved planes generated from a parabolic line either at right angles to the central axis or at any suitable angle whose inclination is constant; or it may itself be variable, and the sections at right angles to said line being also made of parabolic form, while the blades are gradually curved toward the outer circumference of the propeller, so as to present a nearly flat surface toward the water, all of which will be more fully described hereinafter, reference being had to the accompanying drawings and the letters of reference marked thereon.

Like letters refer to like parts in the different figures of the drawings, in which—

Figure 1 represents a front and side elevation of my improved propeller. Fig. 2 is a front and side elevation of a single blade of modified form.

As is well known to those skilled in the art, the ordinary propellers have several disadvantages—as, for instance, that in too rapid rotation they lose far too much in effectiveness in proportion to surface; that in consequence thereof during their action the water is sprayed or churned and thrown off from the blades in line with the axis of the propeller with great expenditure of power; that the water is caused to whirl too much, and is thinned or formed into foam instead of being solidified, and that there is too large an amount of slip in proportion to the effect produced. To overcome these objections and disadvantages is the prime object of my invention, which is accomplished by its peculiar construction, and at the same time to increase its effectiveness with much less power.

In the accompanying drawings, in Fig. 1, the hub A is of ordinary construction, and in this case a two-bladed propeller is shown. From the hub the blades B C extend, and are formed of a series of parabolic-shaped cross-sections, *a, b, c*, &c., there being but three shown, as the intermediate ones are of similar cross-section, and they vary according to the dotted line *x*, shown on the upper blade of the drawings. The inner and outer lines, D E, also form a parabola, and in the side elevation they would appear with the outer ends twisted so as to present a parabolic surface to the water at right angles to the central axis of the hub. It will be thus seen that following a parabolic leading-line or central rib, *d*, either vertically or at any angle to the axis whose inclination is a constant or variable one, moving normally on the central line as the likewise parabolically-curved generating-line, the parabolic lead-line can, according to the accompanying drawings, be also chosen as a representation of a screw. The parameters of the central line, as also those of the production-line, are governed (as is the case in the construction of the present ordinary types of propellers, according to their size as well as the proportions or water-lines of the vessel) by the size of propeller required. If, for instance, the parameter of the central line is $\frac{2}{3}$ of the diameter of the screw, which is determined in similar manner as is done in ordinary propellers, then the parameters of the parabolas to be produced, which are obtained by normal sections parallel with the axis of the screw at any desired points of the blades, and will be as follows: $\frac{m}{n} \frac{h}{i} \frac{o}{p}$, &c.—in short, they will be in proportion of the parameter to the central line. As producing-line may be chosen for each case, either one and the same parabola or (as will be seen from the drawings) a constantly varying parabola may be selected. Further, for the producing as well as the central line different parabolas may be employed. According to this construction, the central line formed out of the parabolic parts of the producing-line of such a screw-blade will assume different positions to the axis of the screw, and will be either: *a* vertically to the axis, *b* an obtuse angle from the vessel, *c* an

acute angle from the vessel—so that the entire blade is either not curved or inclined, but vertical, or, if desired, is curved or inclined, or finally curved or inclined forward. The scale of this curving or inclination also depends upon the object for which the vessel is intended, its construction, the proportions of the engines, and the intended speed of the vessel, and is therefore variable. Finally, the above-mentioned conditions must be considered whether the blades are vertical or curved toward or from the vessel. For this construction of propellers the use of two blades is ordinarily to be recommended, although more than two blades may be employed.

As materials for the production of this propeller, I prefer to use tempered white cast-iron, manganese-bronze, and phosphor-bronze, although all other kinds of bronzes, also cast-steel, wrought-iron, welded steel, or other materials may be employed.

The advantages gained by the construction of the above-described propeller are as follows: The water is taken up very quickly and readily at the basis of the cone angle which revolves around the axis, is then compressed, and forced off in the direction of the line of travel. This taking up of the water at the front end, compressing and forcing it off toward the rear (by which a funnel shape is obtained with its pointed end rearward, the walls of which are formed by the relatively quiet surrounding water) gives a much greater backward action, and is continuously increasing the greater the reacting swiftness of the propeller becomes, but of course only to a certain degree of maximum. In consequence of the angle or curve of the blade to the axis, they enter continuously into the relatively quiet keel-water. Furthermore, the sharp edges of the blades

enter in nearly vertical direction into the water, and leave the same in nearly horizontal direction. By this arrangement the whirling and all other loss or waste of power and work are obviated. The parabolic curved planes cause, in short, that the water taken hold of is compressed in the line of action, and is then delivered by the still following inclined planes more easily toward the pressure exerted, while at the same time, by the hollow shape of the entire screw, a positive way in the direction of the cross-sections of the blades is formed in such manner that the propeller really wedges the particles of fluid into the surrounding relatively quiescent water, and only forces it off in a converging direction at the axis. Finally, this new propeller, on account of its peculiarly shaped or curved planes, is not liable to be broken nor to become bent, and at the same time it can be made much lighter, and permits of a great reduction of thickness as well as forming of very sharp entering-edges.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

A propeller, as herein shown, having blades formed of a series of cross-sections of parabolic shape from the hub to the periphery, and the blades gradually bent to be at right angles to the center of axis of the hub, substantially as specified.

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

ADOLF GRAF VON BUONACCORSI DI PISTOJA.

Witnesses:

C. O. PAGET,
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