

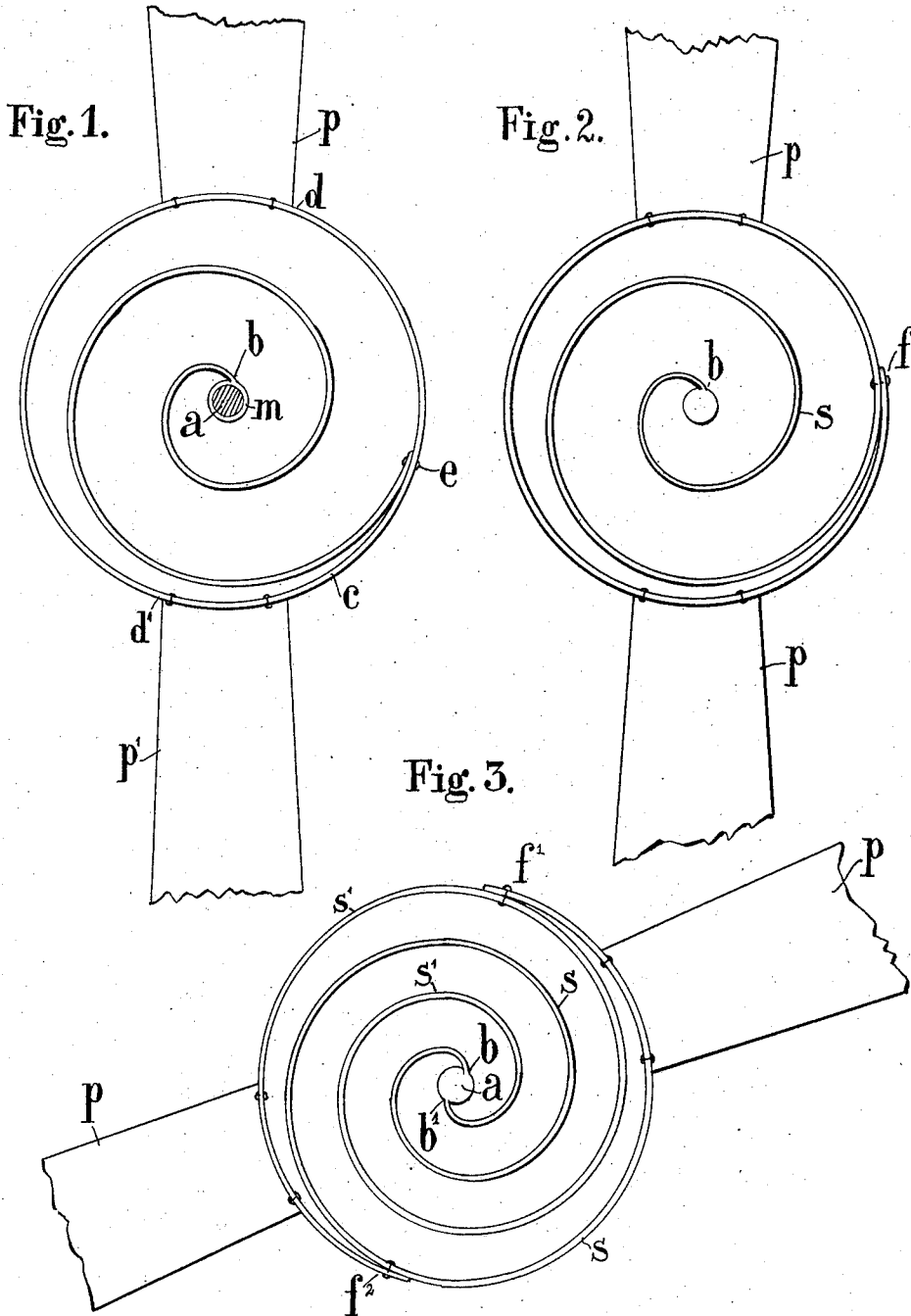
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SCREW PROPELLER WITH OPEN CENTER.

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Patented May 7, 1912.



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SCREW-PROPELLER WITH OPEN CENTER.

1,025,658.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ANDRÉ JULIEN MAHOUDAU DE VILLETHIOU, a citizen of the Republic of France, residing at 17 Rue Littré, Paris, France, have invented certain new and useful Improvements in Screw-Propellers with Open Centers, of which the following is a full, clear, and exact description.

The screw propellers actually employed for aerial or marine navigation are accompanied by a very serious disadvantage. The boss of the screw propeller and the inactive base of the blade, when the apparatus is traveling at full speed, cooperate to form a rigid and impenetrable center which, not allowing the air to pass, constitutes in reality an opposition to the forward movement, a disadvantage which becomes apparent in a very noticeable resistance. Owing to the dimensions and the speeds attained by propellers for aerial navigation, this opposition is more noticeable with such propellers than with propellers for marine navigation.

I shall now describe my invention with reference to the accompanying drawing showing various forms of construction of the present invention on which:—

Figure 1 shows part of a screw propeller with free center; Fig. 2 shows a modification. Fig. 3 shows a further modification.

In the arrangement of the screw propeller with free center forming the subject matter of the present invention, the base of the ordinary propellers and the inactive base of the blades are replaced by a special system of support and it is only the active portions of the blades that are employed for propulsion. Thus, with such propellers there are two things to be considered, the support and the blades. The support comprises three parts: 1. The small sleeve *m* which is keyed to the main shaft *a* and serves as center for the screw. 2. The spiral rod *s* the one end of which is fastened to the sleeve *m* at a point *b* and the other end of which is fastened at *e* to the inner surface of the large circle *c*. 3. The large circle *c*, to the inner wall of which the spiral rod *s* is fastened at *e*, and which serves as support for the blades. The required number of blades *p, p'* are fastened to the outer surface of the circle *c* at the points *d* and *d'*, care being taken to give the blades the requisite angle of inclination. In the construction of such screws with free center the circle-support *c*

should preferably be of such dimensions that its radius is equivalent approximately to one-fifth or one-fourth of the radius of the propeller.

From what has been stated above it is evident that by reducing the boss of the screw as far as possible and dispensing with the inactive portions of the blades, when traveling the center of the apparatus offers a free passage for the air, whatever may be the diameter of the center or whatever may be the speed imparted by the engine. This arrangement does away with the above-mentioned opposition to the progress of the apparatus. Such screws can be constructed so as to reverse and, indispensable as the arrangement of the free center is for aerial navigation, in marine navigation also it gives much higher efficiency than with the systems actually employed.

Various forms of construction of such screw-propellers with free centers are possible without in any way deviating from the fundamental principle of the invention. For example the sleeve *m* is solely for the purpose of attaching the screw to its shaft and of enabling it to be dismantled. As a matter of fact the spiral may be fastened directly to the rotary part, that is to say to the main shaft or any other suitable part on rotary engines. As regards the circular support *c* carrying the blades this may also be dispensed with and the blades mounted directly on the spiral the free end of which is fastened to the adjoining inner convolute. Furthermore without departing from the fundamental principle of the invention the spiral may be fastened directly to the rotary portion of the boss and the blades or active surfaces are mounted directly on the spiral, in which case the free end of the spiral is fastened to the adjoining inner convolution. Furthermore any desired number of spirals may be arranged in suitable positions, the one above the other or side by side, may be employed and on which the blades or the like are mounted with or without the use of any intermediate parts.

Fig. 2 shows a spiral *s* the end *b* of which is fastened to the main shaft, the free end of the spiral being fastened at *f* to the adjoining inner convolution so that the outer portion of the spiral forms a continuous circle on which any desired number of blades *p* are suitably mounted.

Fig. 3 shows a modification employing

two spirals s , s' which are joined together at their outer ends, the spiral s being fastened to the spiral s' at f' and the spiral s' to the spiral s at f^2 .

5 Having thus described my invention what I claim is:

10 1. In a screw propeller a main shaft a sleeve keyed to said shaft, a spiral having one end secured to said shaft, a circular support to which the other end of said spiral is secured and blades mounted on said circular support.

2. In a screw propeller a shaft, a spiral having one end secured to said shaft and having its other end secured to the adjoining inner convolution of said spiral and blades mounted on said spiral, as specified. 15

In testimony whereof I affix my signature.

ANDRÉ JULIEN MAHOUEAU DE VILLETHIQU.

In presence of two witnesses—

GEORGES VILLEBESSEUX,

CHARLES MEUNIER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."