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A.D. 1836 . . . . . N° 7149.

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**Propeller for Steam Navigation.**

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**ERICSSON'S SPECIFICATION.**

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN ERICSSON, of Brook Street, New Road, in the County of Middlesex, Civil Engineer, send greeting.**

**WHEREAS** His present most Excellent Majesty King William the Fourth, by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Thirteenth day of July, in the seventh year of His reign, did for Himself, His heirs and successors, give and grant unto me, the said John Ericsson, His especial licence that I, the said John Ericsson, my exors, admors, and assigns, or such others as I, the said John Ericsson, my exors, admors, or assigns, should as any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and all His Majesty's Colonies and Plantations abroad, my Invention of "**AN IMPROVED PROPELLER APPLICABLE TO STEAM NAVIGATION;**" in which said Letters Patent is contained a proviso obliging me, the said John Ericsson, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be inrolled in His said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

*Ericsson's Improved Propeller for Steam Navigation.*

NOW KNOW YE, that in compliance with the said proviso, I, the said John Ericsson, do hereby declare the nature of my said Invention to consist in two thin broad hoops, or short cylinders, made to revolve in contrary directions round a common centre, each cylinder or hoop moving at a different velocity from the other, such hoops or cylinders being also situated entirely under the water at the stern of a boat, and furnished each with a series of short spiral planes or plates, the plates of each series standing at an angle the exact converse of the angle given to those of the other series, and kept revolving by the power of a steam engine, whereby a steam boat may be propelled effectually, notwithstanding any variations in its draught of water; and in further compliance with the said proviso, I, the said John Ericsson, do hereby describe the manner in which my said Invention is to be performed by the following statement thereof, reference being had to the Drawing annexed, and the figures and letters marked thereon, that is to say:—

## DESCRIPTION OF THE DRAWING.

Figure 1 represents a longitudinal section of the stern of a steam boat, with my improved propeller attached. A and B are two cylinders, or broad hoops of wrought iron, supported by spiral arms or spokes, which will be explained hereafter. The hoop A is attached to the axis *a, a, a*, and the hoop B to the axis *b, b, b*, which latter axis is made hollow in order to admit the former to pass through and work within it, and both these axes pass directly through the centre of the stern post into the body of the vessel. 1, 2, 3, 4, 5, and 9, 10, 11, 12, 13, are thin metallic plates, attached by rivets to the hoops A and B, the face of each plate being twisted so as to form a portion of a spiral plane or thread, the exact form of which will be determined and may be obtained by forming a cylinder and coiling a thread or blade spirally round it, on the principle exhibited by the diagram represented in Figure 2, in which A, A, A, represent a cylinder of equal diameter with the hoops A and B in Figure 1. *a, a, a, a, a, a, a, a*, are eight thin spiral planes or plates, of the same width as the plates 1, 2, 3, 4, 5, and 9, 10, 11, 12, and 13, in Figure 1, and coiled round the said cylinder A, A, A, spirally, like the thread of a screw, the coils being placed at equal distances from each other, and each having such a fall or inclination that it will not have passed once round the cylinder until it has advanced along it a distance equal to three times its diameter. Now if the said cylinder A, A, with its spiral plates or threads, be cut off through the lines D, E, and F, G, the portions of the spiral plates between the said lines, and which are here numbered 9, 10, 11, 12, and 13, shew the exact forms and positions which the plates represented in Figure 1, by corresponding numbers, should be made to

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assume, while the form and positions of the plates 1, 2, 3, 4, and 5, will be determined in a similar manner, by running the coils in a contrary direction round the same cylinder.

Having thus explained the manner in which I determine the forms and positions of the spiral plates on the hoops A and B, I will now continue the description of Figure 1. *c, c, c, c, d, d, d, d,* are narrow hoops of wrought iron, passing round and rivetted at the parts marked D in Figure 3 to the spiral plates, in order to secure them more firmly in their places; *E, E, E,* is a strong wrought iron stay (better seen in Figure 3) firmly bolted to the stern of the vessel; *e, e,* is a brass bearing fixed in the said stay E, which bearing carries the outer and enlarged end of the shaft *a, a, a,* the other end of the shaft being carried by and working through a stuffing box F attached to the shaft *b, b, b,* which shaft is supported by a strong cast iron framing G, and plummer block *g;* C is a stuffing box fixed to the stern post, to prevent the water from entering the vessel round the shaft *b, b, b,* which should work freely through the stern post; H and I are two broad cog wheels working together, I being about one fifth larger than H, and attached to the shaft *b, b, b,* and H being attached to a crank shaft L, L; M, M, is another crank shaft, attached to the shaft *a, a, a,* by the coupling box N; *l* and *m,* are cranks on the shafts L and M, supported by cast iron frames P, P, and plummer blocks or bearings *p, p, p, p;* Q and R are also cranks on the shafts M, M, and L, L, fixed at right angles to the cranks L and *m;* *q* and *r* are crank pins, and S, a coupling link by which the cranks Q and R are coupled together; T is a connecting rod, and U is a coupling link attached to the cranks *l* and *m.* This connecting rod is to be connected in the ordinary manner to the piston rod or beam of a steam engine, the cylinder of which may be placed either vertically or horizontally across the vessel; another connecting rod connected to another engine may be attached to the crank pin *q* in a similar manner, by which a more regular power will be communicated to the cranks and shafts *m, M,* and *l, L.* It is evident that if motion be communicated to the cranks *l* and *m,* the shafts L and M must be turned round in one and the same direction, and that therefore the shaft *b, b, b,* by means of the unequal cog wheels I and H, will move in a contrary direction to the shaft *a, a, a,* and at a less speed, and at the same time the broad hoops A and B, with their spiral plates, will move in contrary directions, and at unequal velocities. It should be stated that when the cylinder A, and its plates 1, 2, 3, 4, and 5, as viewed from the vessel, revolve to the left, the vessel will be propelled forward, and when moved to the right, the vessel will be backed; W, W is the rudder divided into two parts, held together by two strong wrought iron stays V, fixed one on each side, having wide loops or bends at *v,*

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to admit of the free motion of the rudder. Figure 3 represents an end view of one of the broad hoops A, with its spiral plates; e, e, e, e, are cross-stays, to give additional strength to the stay E, E; X, X, X, are the three wrought iron spiral arms or spokes to the hoop A before alluded to, and constructed in manner here shewn, in order to prevent the resistance which would otherwise be presented by them to the progress of the vessel. These arms all meet in the centre, where they are welded to a boss Y, which is afterwards bored to receive the shaft a, a, a, upon which it is firmly keyed by the keys z, z, z; D, D, D, D, D, D, D, D, are the angle-pieces, which join the several pieces c, c, c, c, c, c, c, c, of the narrow hoop that supports the spiral plates on the broad hoop; J represents the ordinary water line.

Now whereas I claim as my Invention the improved propeller herein-before described, having the outer cylinder or hoop performing a greater number of revolutions in a given time than the hoop nearest to the vessel, and the general arrangement of the same as aforesaid; and such my Invention being to the best of my knowledge and belief entirely new, and never before used within that part of His said Majesty's United Kingdom of Great Britain and Ireland called England, His said Dominion of Wales, or Town of Berwick-upon-Tweed, nor in any of His said Majesty's Colonies and Plantations abroad, I do hereby declare this to be my Specification of the same, and that I do verily believe this my said Specification doth comply in all respects, fully and without reserve or disguise, with the proviso in the said herein-before in part recited Letters Patent contained: wherefore I do hereby claim to maintain exclusive right and privilege to my said Invention.

In witness whereof, I, the said John Ericsson, have hereunto set my hand and seal, this Thirteenth day of January, in the year of our Lord One thousand eight hundred and thirty-seven.

JOHN (L.S.) ERICSSON.

CROSS. AND BE IT REMEMBERED, that on the Thirteenth day of January, in the year of our Lord 1837, the aforesaid John Ericsson came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Inrolled the Thirteenth day of January, in the year of our Lord One thousand eight hundred and thirty-seven.

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