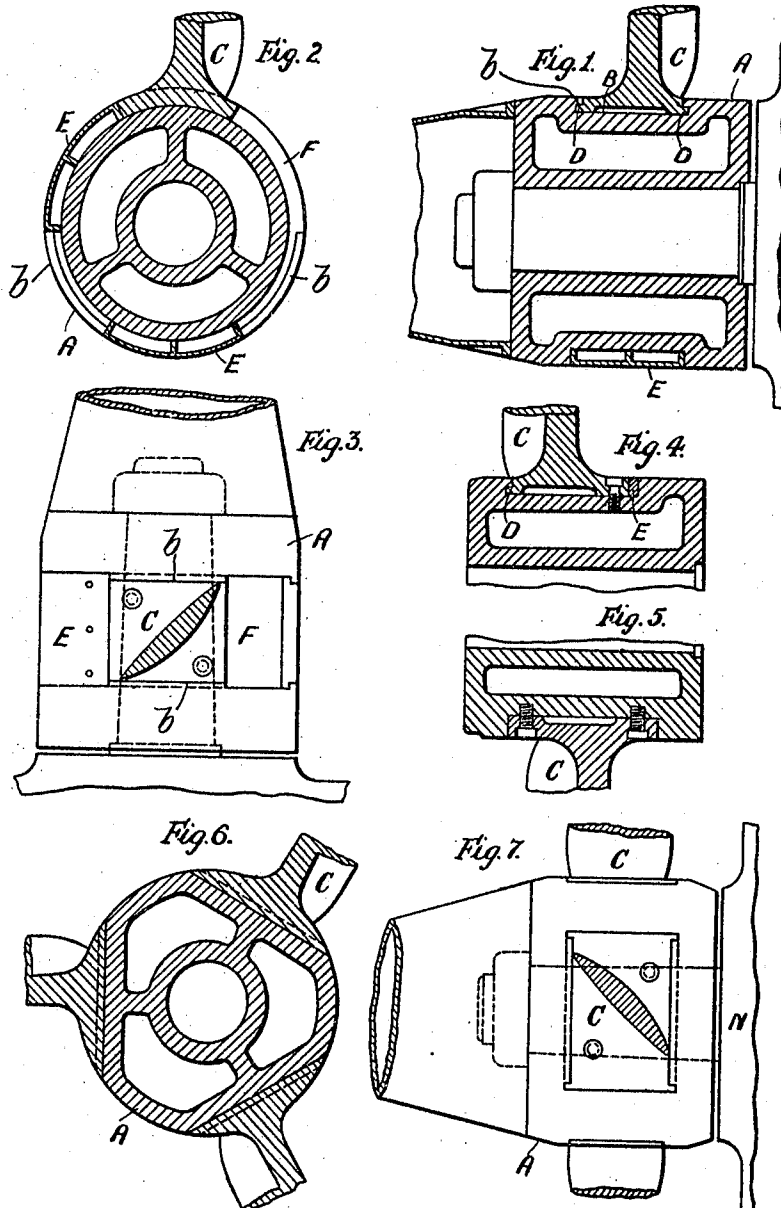


J. HOWDEN.
SCREW PROPELLER.
APPLICATION FILED MAR. 30, 1908.

945,237.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.



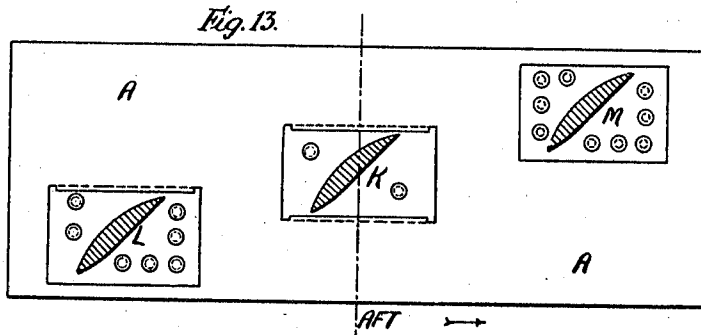
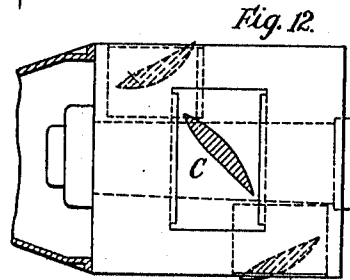
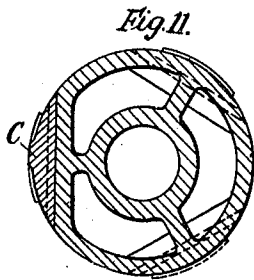
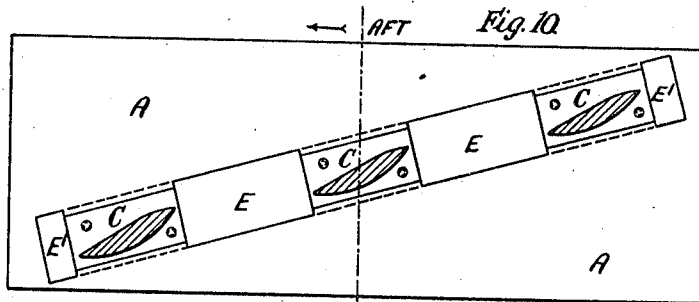
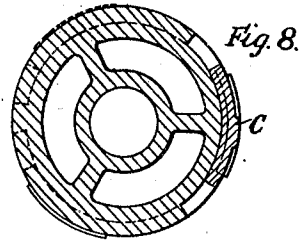
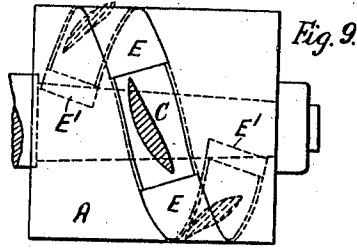
Witnesses:-
C. H. Crawford
E. Schallinger

Inventor:-
James Howden
by B. Singer
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JAMES HOWDEN, OF GLASGOW, SCOTLAND.

SCREW-PROPELLER.

945,237.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed March 30, 1908. Serial No. 424,197.

To all whom it may concern:

Be it known that I, JAMES HOWDEN, a subject of the King of the United Kingdom of Great Britain and Ireland, and residing at Glasgow, Scotland, have invented certain new and useful Improvements in and Relating to Screw-Propellers, of which the following is a specification.

This invention relates to screw propellers in which the blades are attached to cylindrical centers or bosses so that when the blades are fixed in position the propeller appears like one, with the blades and boss cast in one piece; the spaces between the blades and the other parts being without projections so that a free passage is given to the water and the action of the propeller is made more effective; the diameter of the boss being made less than that of a spherical boss, and the blades being more securely fixed.

The invention is applicable to propellers in which the blades are placed on the boss so as to revolve in the same plane when the shaft is turned without forward and aft movement, and also to propellers in which the blades are placed on the boss in different positions fore and aft of each other.

The invention consists broadly in forming the boss with a recess encircling the same into which recess the blades are fitted; said recess being formed either as a complete circle or as an interrupted circle or as a spiral, so that in entering into position the blades are moved circumferentially and not longitudinally.

The invention is illustrated in the accompanying drawings in which—

Figures 1 and 2 are, respectively, a longitudinal section and cross section of a cylindrical propeller boss showing one form of propeller with the blades entering a circular recess in the boss. Fig. 3 is a plan corresponding to Fig. 2 showing one blade in cross section. Figs. 4 and 5 are each longitudinal sections showing modifications. Figs. 6 and 7 are respectively a cross section and a side elevation showing an alternative form in which the recess is formed as an interrupted circle. Figs. 8, 9 and 10 are respectively a cross section, elevation and developed plan showing a further alternative form in which the recess is formed as a helix encircling the boss. Figs. 11, 12 and 13 are views corresponding to Figs. 8, 9 and 10 showing a modification.

As shown in Figs. 1, 2 and 3, A is a cylindrical propeller boss, formed with an annular groove B for receiving the bases or flanges of the blades C and formed with shoulders *b* at intervals, the flanges having projections D on each side adapted to engage with the under sides of said shoulders. One shell filling piece E between the bases of the blades is shown in Fig. 1, and two are shown in Fig. 2 which also shows one widened space F without the filling piece. In Fig. 3 one filling piece is shown on one side of the fixed blade and one widened space F on the other side. The filling pieces are held in place by pins or the like. In this construction the blades are put first into the widened or open parts of the groove, then pushed along into exact position in the part of the groove where the projections D engage below the shoulders. In Fig. 3 two screw pins with heads sunk into recesses in the flange are shown; these pins assist in resisting the strains on the blades in propelling, but they are used chiefly to insure that the blades will be always brought into exact position on the boss; said pins may however be dispensed with.

In the modification shown in Fig. 4, shoulders *b* are formed on one side only of the annular groove B, the base of each blade having a projection D on one side only; the other side being held by screw pins, thin side filling or distance piece E being interposed.

In the modification shown in Fig. 5 the annular groove B is formed without shoulders, the blades being held on each side by screw pins.

In the alternative form shown in Figs. 6 and 7 the recess is formed as an interrupted circle, the flat seats of the blades lying in a circular line and the bases or flanges of the blades C being segments of a cylinder which when fixed in place complete the cylindrical boss, no filling pieces being required. The blades C are shown as held in the boss by projections on each side of the flange fitting into corresponding recesses in the boss.

In the alternative form shown in Figs. 8, 9 and 10, the recess in the boss is formed as a helix encircling the boss. Fig. 8, shows the groove or recess continued around the greater part of the circumference in dotted lines, and the circumferential positions of the blades C. Fig. 9 shows the blades C placed in different positions fore and aft on

the boss A, the blades being sectioned circumferentially close to the periphery of the boss and without the usual filletings. In the development of the circumference of the boss shown in Fig. 10 the helical groove or recess is shown as being of a length sufficient to receive the three blades C. At each end of the recess short filling pieces E' are shown; filling pieces E are interposed between the bases of the blades.

In Figs. 11, 12, and 13, three blades are shown with their flat bases placed fore and aft on a cylindrical boss, three arrangements for securing the blades in the position being indicated at K, L, and M.

Having now described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. In a screw propeller the combination with a cylindrical boss formed with a recess encircling said boss, of blades formed with correspondingly shaped bases adapted to fit said recess, and means for securing said blades in position.

2. In a screw propeller, the combination with a cylindrical boss formed with a recess encircling said boss, of blades formed with bases adapted to fit said recess, and filling pieces fitted in said recess and interposed between the blades.

3. In a screw propeller, the combination with a cylindrical boss formed with a heli-

cal recess encircling said boss, of blades formed with bases adapted to fit said recess, and means for securing said blades in position.

4. In a screw propeller, the combination with a cylindrical boss formed with a recess encircling the boss, said recess formed with shoulders, of blades formed with correspondingly shaped bases adapted to fit said recess, and means for securing said blades in position.

5. In a screw propeller, the combination with a cylindrical boss formed with a recess encircling said boss, said recess formed with shoulders, of blades formed with bases adapted to fit said recess, and filling pieces in said recess and interposed between the blades.

6. In a screw propeller, the combination with a cylindrical boss formed with a helical recess encircling said boss, said recess formed with shoulders, of blades formed with bases adapted to fit said recess, and means securing said blades in position.

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

JAMES HOWDEN.

Witnesses:

WALLACE FAIRWEATHER,
JOHN McCLEARY, Jr.