No. 657,844. Patented Sept. 11, 1900.

A. A. WILLIAMS & G. W. JOHNSON.

REVERSIBLE PROPELLER.

(Application filed Apr. 27, 1899.)

(No Model.)

Fig. 1.

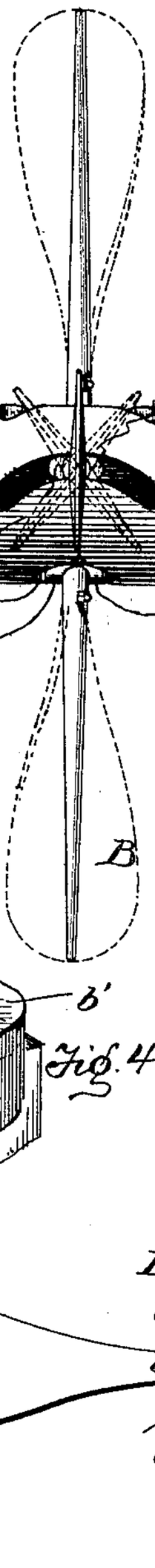


Fig. 2.

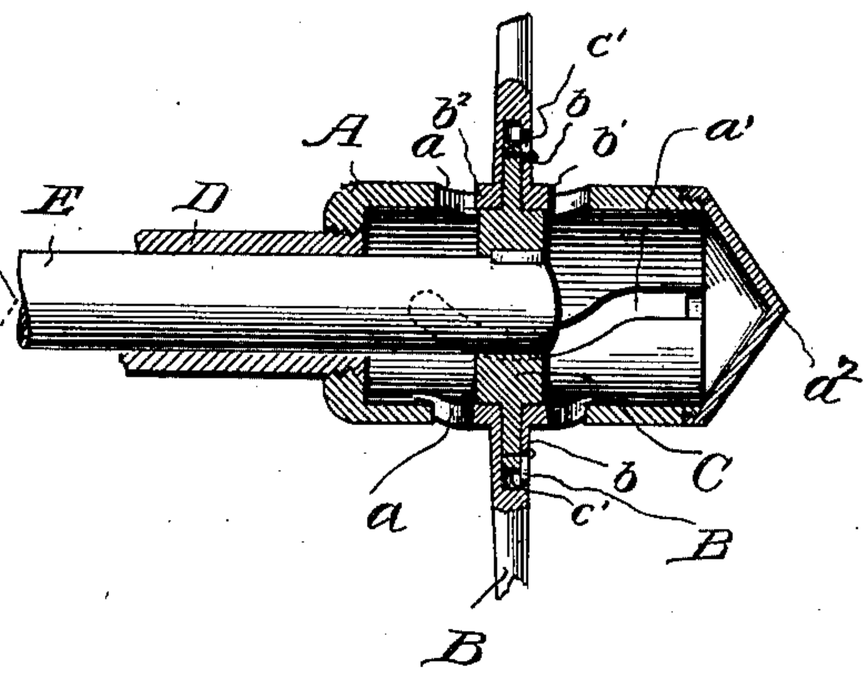
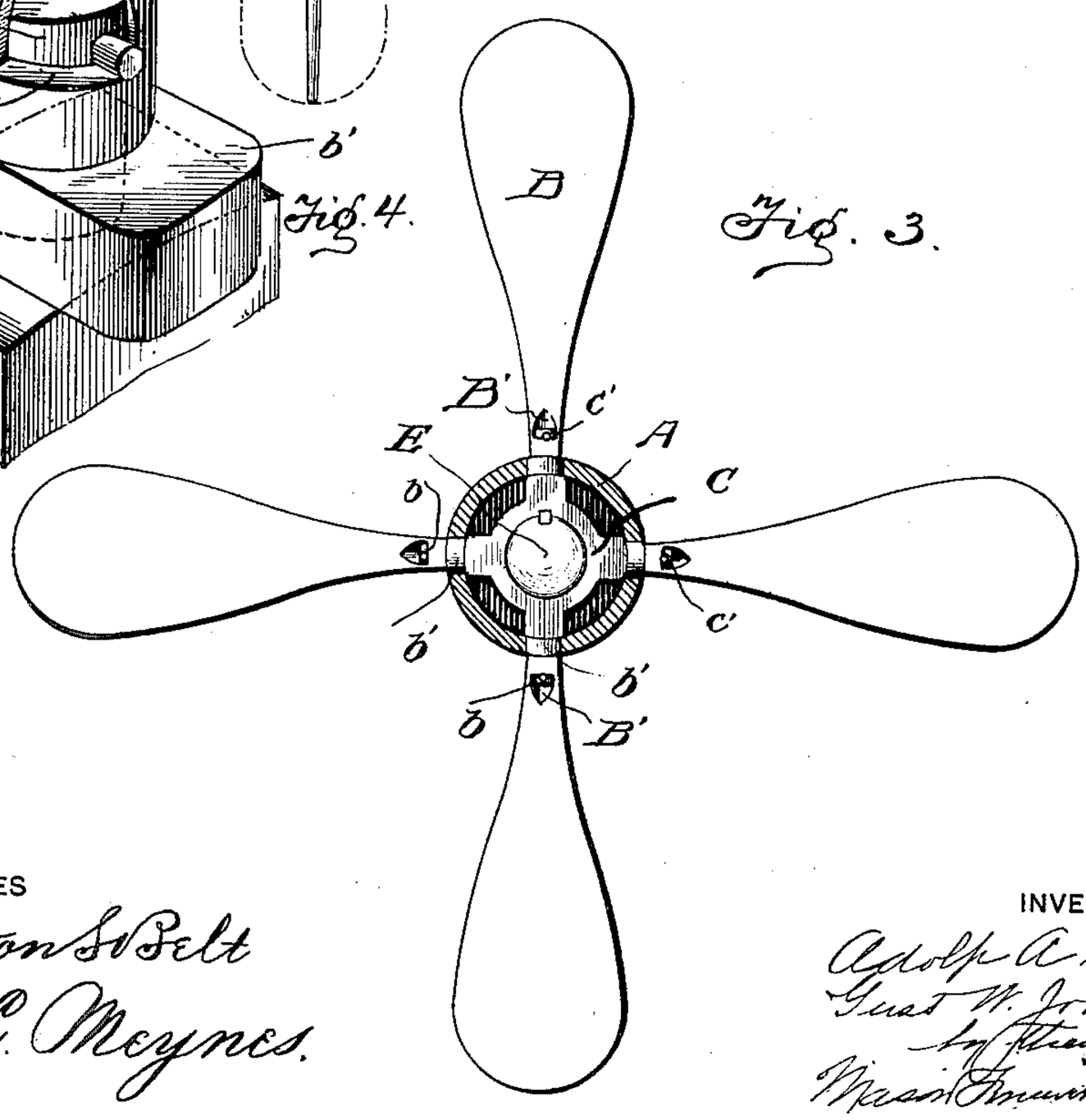


Fig. 4.

Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

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REVERSIBLE PROPELLER.

SPECIFICATION forming part of Letters Patent No. 657,844, dated September 11, 1900.

Application filed April 27, 1899. Serial No. 714,728. (No model.)

To all whom it may concern:

Be it known that we, ADOLPH A. WILLIAMS, residing at Duluth, county of St. Louis, and State of Minnesota, and GUSTAF W. JOHNSON, residing at Superior, county of Douglas, and State of Wisconsin, citizens of the United States, have invented certain new and useful Improvements in Reversible Propellers; and we 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.

Our invention relates to improvements in propellers; and the invention consists in journaling the propeller-blades to a cross-head arranged on a longitudinally-fixed shaft, which blades acquire the desired pitch from being rolled forward or backward by a suitable sleeve or cam mechanism, as will be hereinafter described and specifically claimed, whereby a vessel can be driven forward or backward and the direction reversed through the propeller without reversing the engine; and the invention also consists in certain other novel constructions and arrangements of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of our improved propeller and cam mechanism. Fig. 2 is a longitudinal section through the same. Fig. 3 is a cross-section on the line of the cross-head of the shaft; and Fig. 4 is a perspective view of the lower portion of one of the blades, showing its manner of connection with the cross-head.

In the accompanying drawings, A is a hollow head or housing which is provided with two or more curved slots *a*, having optional rearward and horizontal continuations *a'* and provided with a cap or plug a^2, preferably conical in shape, which cap is screwed onto the head A and may be further secured thereto, if desired, by lateral screws or bolts.

B B represent propeller-blades which are made hollow at their inner ends, each blade being provided with a transverse opening B', forming a shoulder or seat *b* for a wrist-pin *c'*, said pin being designed to permit of the blades assuming an inclined direction, said blades being also formed with lugs or extensions b' and b^2, which operate in the curved slots *a* in the housing A and coöperate with the wrist-pin *c'* to hold the blades in connection with said cross-head and at the same time admit of the blades being given a forward or backward inclination for running the vessel either backward or forward.

C represents the cross-head, which is keyed or otherwise rigidly secured to the outboard end of the shaft E, the projecting arms of which head are reduced in size and extend into the hollow ends of the blades B. These ends are provided with apertures into which the wrist-pins *c'* are inserted through the transverse openings B' in the blades B, as clearly shown in Fig. 4, said pins, as stated above, having movement on the seat or shoulder *b* of said transverse opening B'.

D represents a sleeve which incloses the shaft E and is longitudinally movable thereon and is screwed into the outboard end of the cam-head A and is provided at the inboard end with a suitable lever mechanism, (not shown,) by means of which said sleeve and its outboard attachment may be drawn forward or backward. The lugs b' b^2 of the propeller-blade engage and travel in the curved slots *a* in the cam-head A. It will thus be seen that by means of any suitable mechanism within the vessel the sleeve D and attached cam-head A may be drawn forward or thrust back, by means of which the propeller-blades attached to said cam-head through the lugs b' b^2 and journaled upon the wrist-pin *c'* receive a partial revolution or rearward or forward inclination in the direction of the axis of the shaft E, resulting while the twist of the shaft is always in one direction in the vessel being driven forward or backward as desired. The twist of the shaft and the sleeve D always in the same direction prevents the cam-head from being detached in service, while the same may be readily detached for repairing or replacement, as the curved slots *a* through the continuations *a'* thereon extend to the removable cap or plug a^2. The cam-heads may, however, be secured to the sleeve in any other suitable or desirable manner than that shown and described and still be within the spirit of our invention.

It is obvious that the exact construction and arrangement of the wrist-pins and the lugs which operate in the curved slots may be varied without departing from the spirit of our invention.

Having now described our invention, what

we claim as new, and desire to secure by Letters Patent, is—

1. In a reversible propeller, the combination with a propeller-shaft, of a hollow head provided with cam-shaped slots, propeller-blades pivoted to the shaft and having extensions or heads, which engage said slots, and a sleeve movable on the shaft, connected with the head, whereby upon movement of the sleeve, the blades by reason of the coaction of the extensions with the slots, can be given a forward or rearward inclination in the direction of the axis of the shaft, thus to drive a vessel either forward or backward without reversing the engine, substantially as described.

2. In a reversible propeller, the combination of a rotating shaft, a sleeve slidable on said shaft, a hollow head connected to said sleeve and provided with curved slots, a cross-head having arms which project through the curved slots, propeller-blades being provided with a hollow inner end and a transverse passage extending through and into said hollow end which hollow ends receive the ends of the cross-head, and wrist-pins passed through the transverse slots and extending into the cross-head, and projections or extensions on the lower end of the propeller-blades which operate in the curved slots in the hollow head of the housing, substantially as described.

3. In a reversible propeller, the combination of a propeller-shaft, one or more cross-heads fixed to the outboard end of the shaft, a plural number of propeller-blades, provided with lateral lugs and revolubly attached to the ends of the cross-head or cross-heads, a cam-head provided with a plural number of curved slots in the sides thereof and a sleeve inclosing the propeller-shaft for a part of its length and secured in any suitable manner at its outboard end to the cam-head, substantially as described.

4. In a reversible propeller, the combination of a propeller-shaft, one or more cross-heads fixed to the outboard end of said shaft, a plural number of propeller-blades, provided with lateral lugs, revolubly attached to the ends of the cross-head or cross-heads, a cam-head provided with a rearwardly-extending conical-shaped cap or plug, and provided in its sides with a plural number of curved slots or guideways and a sleeve inclosing the propeller-shaft for a part of the length of said shaft and secured in any suitable manner at its outboard end to the cam-head, substantially as described.

5. In a reversible propeller, the combination of a propeller-shaft, one or more cross-heads fixed to the outboard end of said shaft, a plural number of propeller-blades, provided with lateral lugs, revolubly attached to the ends, respectively, of said cross-head or cross-heads, a cam-head provided with a rearwardly-extending cap or plug and provided in its sides with a plural number of curved slots or guideways adapted to engage the lugs on the propeller-blades, respectively, and having horizontal rearwardly-extending continuations, and a sleeve inclosing the propeller-shaft for a part of the length of said shaft and attached at its outboard end to the cam-head, substantially as described.

6. In a reversible propeller, the combination of a plural number of propeller-blades, revolubly attached to the end of a propeller-shaft cross-head and provided with lateral lugs and a cam-head provided in its sides with a plural number of curved slots or guideways adapted respectively, to engage the lugs of the respective propeller-blades and control the pitch of said blades, substantially as described.

7. In a reversible propeller provided with a shaft, a cross-head on the outboard end of said shaft and propeller-blades revolubly attached to the respective ends of said cross-head and provided with lateral lugs, the combination of a cam-head provided in its sides with curved slots or guideways, adapted to engage the lugs on said blades, substantially as described.

8. In a reversible propeller, provided with a propeller-shaft, a cross-head attached to the outboard end of said shaft and propeller-blades revolubly attached to the respective ends of said cross-head and provided with lateral lugs, the combination of a cam-head provided in its sides with curved slots or guideways adapted to engage the lugs on said blades respectively, and provided with a rearwardly-projecting cap or plug, and a forwardly-projecting sleeve inclosing said shaft for a part of the length thereof, substantially as described.

9. In a reversible propeller, the combination with a propeller-shaft, of a cross-head or cross-heads, fixed to the outboard ends of said shaft, and provided with terminal wrists or apertures as desired, propeller-blades revolubly attached respectively to the respective ends of said cross-heads and provided with lateral lugs extending on either side of each of said blades respectively, substantially in the direction of the axis of said shaft but curved to conform to curved slots, or guideways in a cam-head adapted to engage them respectively, a hollow cam-head provided in its longitudinal walls with curved slots or guideways where cords are parallel with the axis of the propeller-shaft and adapted to engage the lug on said legs and provided with a rearwardly-extending cap or plug and with a forwardly-extending sleeve, said cam-head inclosing the end of said propeller-shaft and part or all of said cross-head and said sleeve inclosing said propeller-shaft for part of its length, substantially as described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

ADOLPH A. WILLIAMS.
G. W. JOHNSON.

Witnesses:
JAMES T. WATSON,
D. D. MCINNIS.