3 Sheets—Sheet 1.

# J. BAIRD.

## Bearings for Screw-Propellers.

No. 203,875. Patented May 21, 1878.

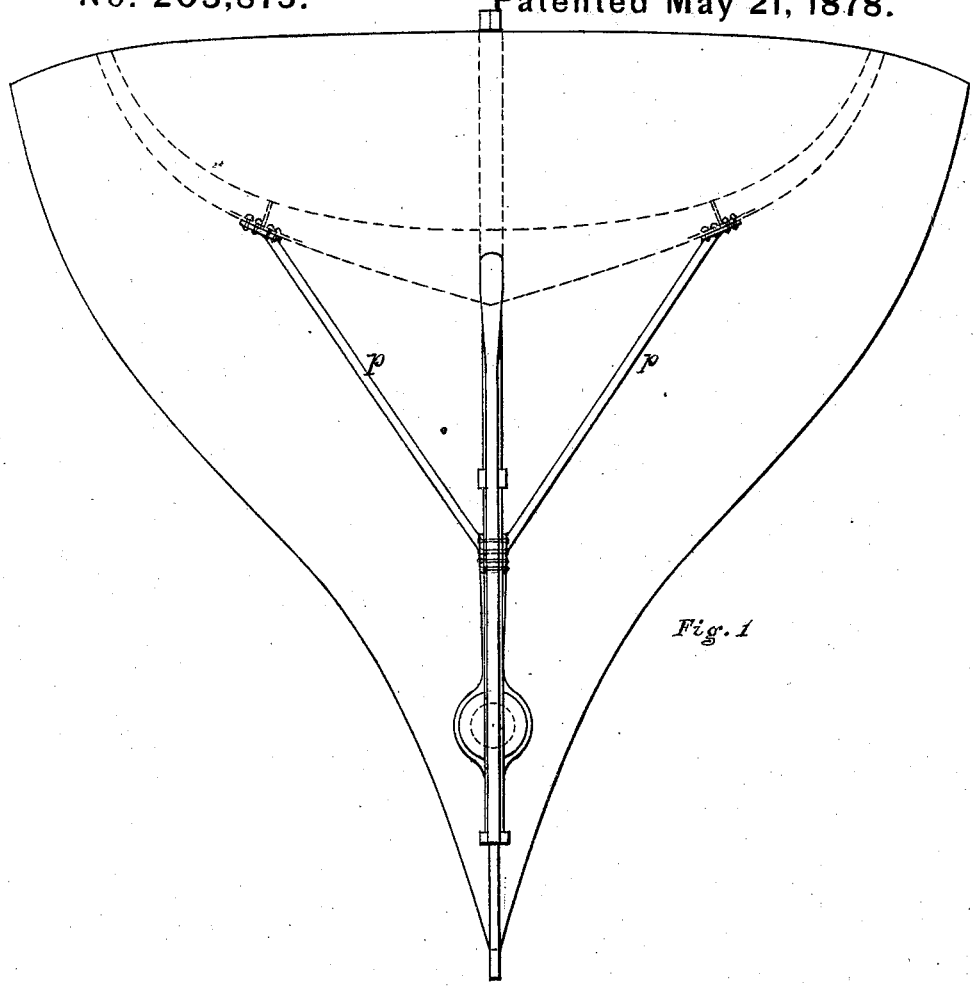


Fig. 1

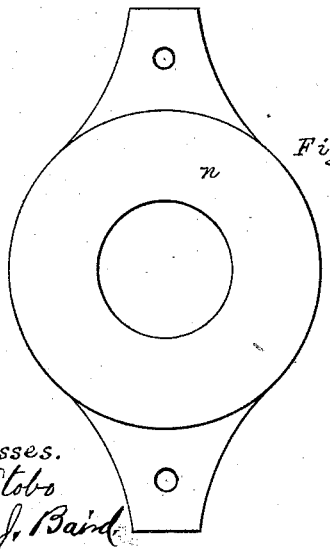


Fig. 2

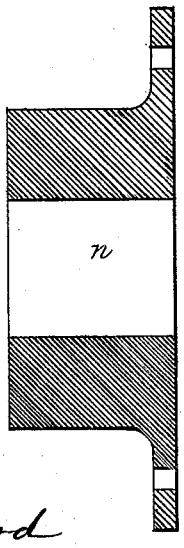


Fig. 3

Witnesses.
M. E. Stobo
Agnes J. Baird

Inventor.
John Baird

# J. BAIRD.

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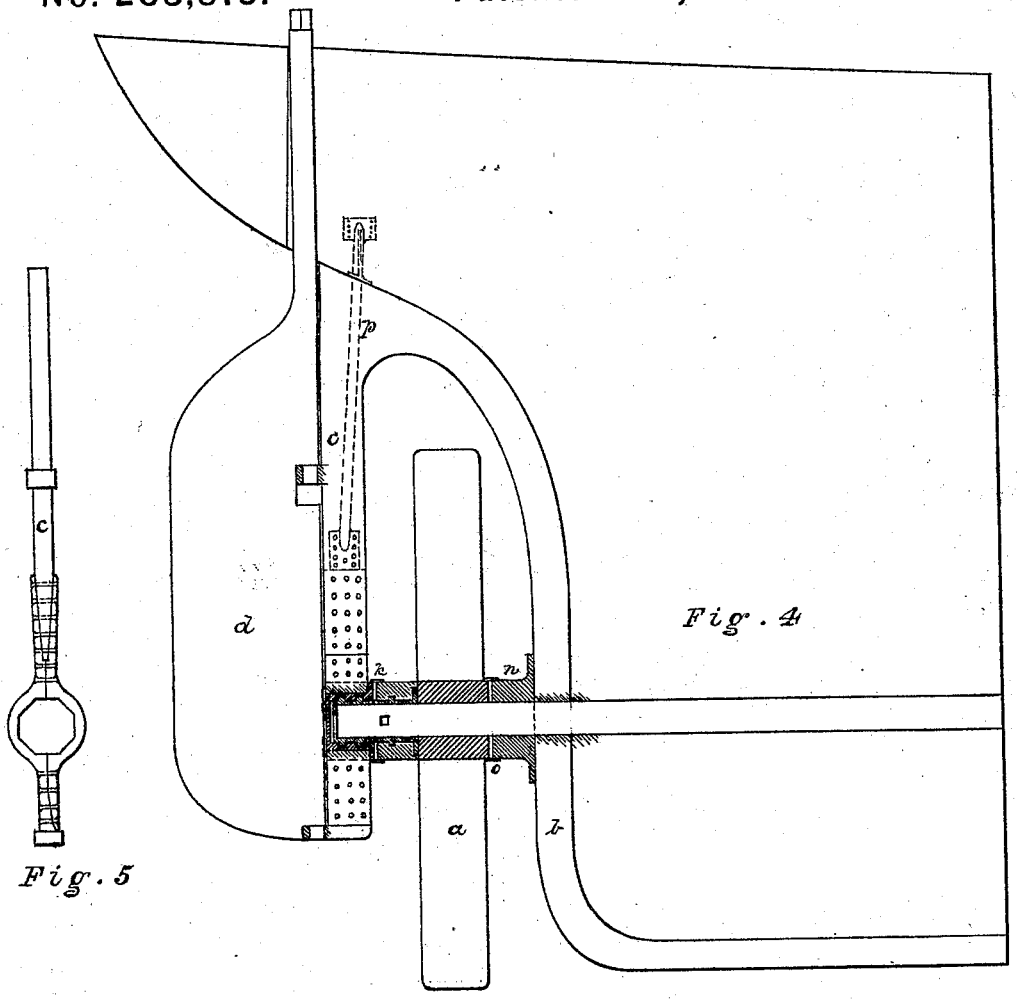


Fig. 4




Fig. 5

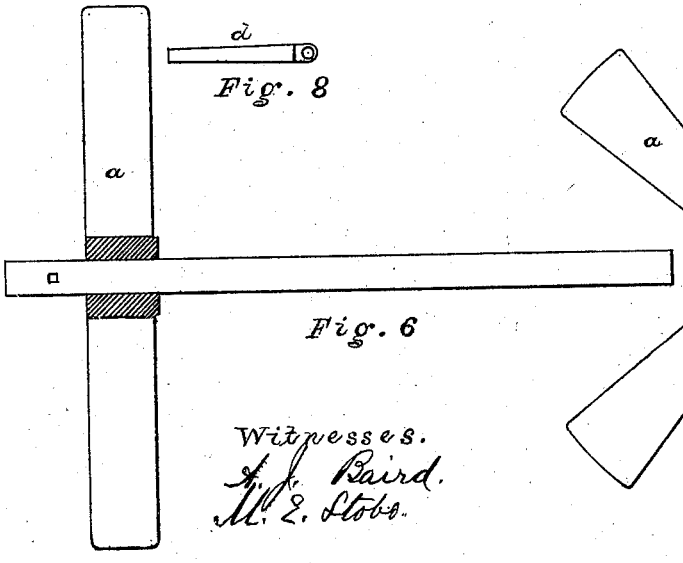


Fig. 6




Fig. 8

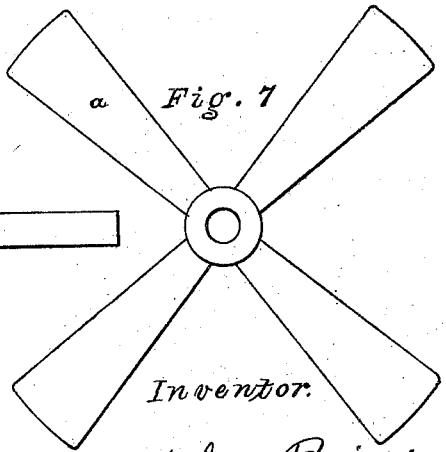


Fig. 7

Witnesses.
A. J. Baird.
M. L. Stobo.

Inventor.
John Baird

3 Sheets—Sheet 3.

# J. BAIRD.

## Bearings for Screw-Propellers.

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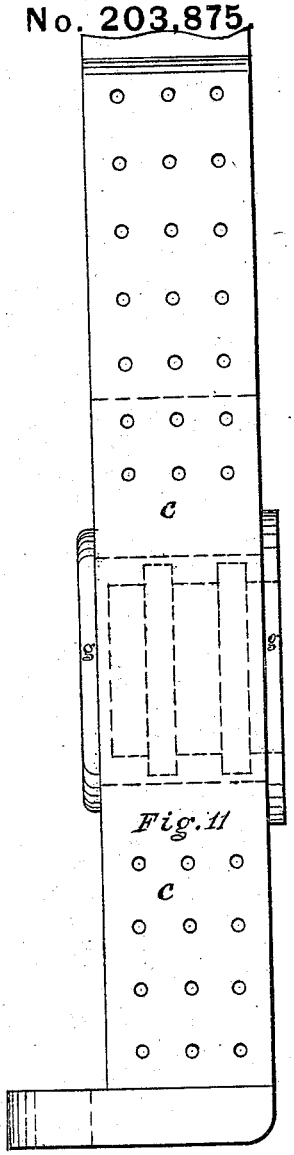


Fig. 11

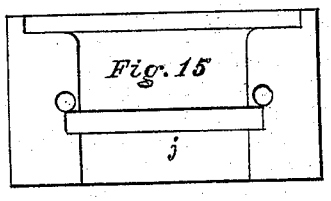


Fig. 15

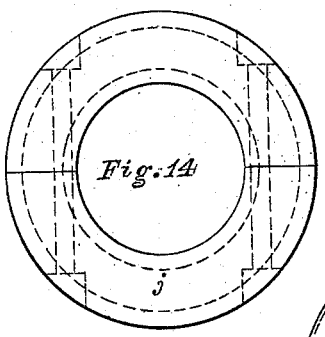


Fig. 14

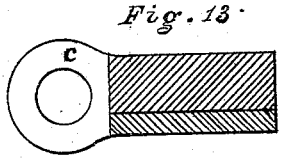


Fig. 13

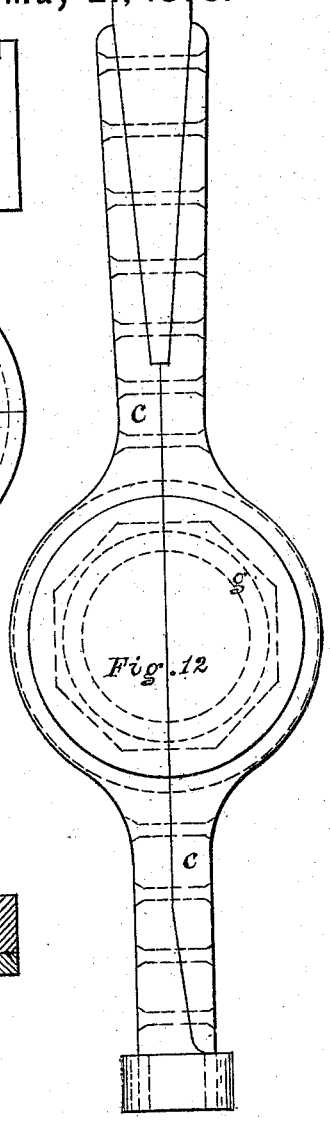


Fig. 12

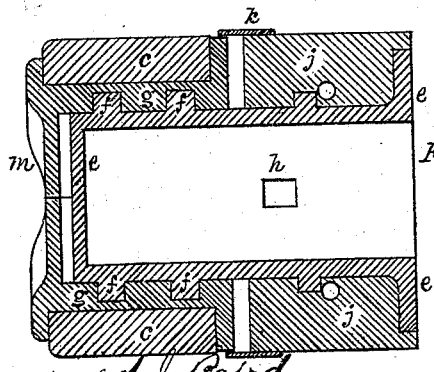


Fig. 10

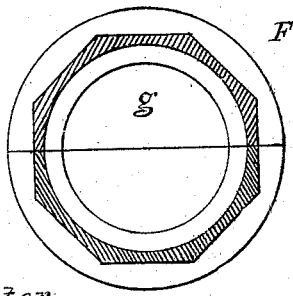


Fig. 9

Witnesses { A. J. Baird. W. E. Stobo

Inventor. John Baird

# UNITED STATES PATENT OFFICE.

JOHN BAIRD, OF NEW YORK, N. Y.

## IMPROVEMENT IN BEARINGS FOR SCREW-PROPELLERS.

Specification forming part of Letters Patent No. **203,875**, dated May 21, 1878; application filed February 4, 1878.

*To all whom it may concern:*

Be it known that I, JOHN BAIRD, mechanical engineer, of the city, county, and State of New York, have invented certain new and useful Contrivances to be Applied in Connection with Ships' Propellers; and that the following, taken in connection with the drawings making part of this specification, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is an elevation of the after body of a vessel with my improvements applied thereto. Figs. 2 and 3 are respectively an end elevation and section through a boss on the true stern-post on a larger scale. Fig. 4 is a vertical central section through Fig. 1. Fig. 5 is an end elevation of the rudder stern-post. Figs. 6 and 7 are views of the propeller and its shaft. Fig. 8 is a plan of the bottom of the rudder. Fig. 9 is a section through the trap in one of the grooves thereof, on a larger scale. Fig. 10 is a horizontal section through the rudder stern-post, showing the brass for the end of the propeller-shaft mounted therein, the sleeve on the end of the propeller-shaft, and the collar on that sleeve, on a larger scale. Figs. 11 and 12 are respectively a side and rear end elevation of the rudder stern-post, and views of the brass which supports the end of the propeller-shaft, on the same scale as Fig. 10. Fig. 13 is a cross-section above the bottom of the rudder stern-post, showing the lower eye for the support of the rudder in plan; and Figs. 14 and 15 are respectively an elevation of the sleeve on the end of the propeller-shaft and a plan of one-half thereof.

In a long course of practice in designing, constructing, and observing the operation of propeller-ships, two defects in their construction have been especially observed by me. First, that the propeller is not immersed deep enough as a whole; and, secondly, that the rubbing-surfaces exposed to currents of water cut away rapidly, especially in such ships as frequently enter or navigate continually shallow waters, or waters much impregnated with silt or sand.

All the improvements herein described conduce to obviate both these defects, and at the same time leave the propeller and rudder in the position which long practice has sanctioned as the best—viz., with the propeller in front of the rudder.

In ordinary propeller-ships there is a shoe connecting the true stern-post or after end of the keel with the lower end of the false or rudder stern-post, and the lowest part of the propeller must lie above the top of this shoe. This shoe forms part of the attachment of the false stern-post to the vessel, and prevents this post from being bent rearward or sidewise or in a diagonal to these directions; and such shoe is, so far as I know, always used in vessels where the rudder is as usual behind the propeller.

My first improvement consists in doing away with this shoe and supporting the false stern-post by the propeller-shaft, as hereinafter explained, so that the lowest part of the propeller may be immersed as deeply or even deeper than the keel, if desired, and when the false stern-post is thus supported by the shaft I prefer to use a false stern-post and rudder which do not descend as low as the keel, (see Fig. 4,) thus securing the rudder and its post from shocks when the vessel grounds, and at the same time relieving them in part from that shock which occurs whenever a blade of the propeller passes the rudder-post. This shortening of the rudder will produce no inconvenience, as it is now generally acknowledged that the lower part of the rudder has comparatively little steering-power, and, even if this theory be false, the rudder can be made wider, so as to secure the required amount of surface.

Although I prefer thus to shorten the rudder and its post, I contemplate sometimes using a rudder and post of the usual length.

My improvements on the second head can be understood only by a special description.

All the drawings show my improvements in their preferred form, and I will describe some modifications thereof.

In the drawings, the propeller is shown at *a*, the true stern-post at *b*, the false or rudder post at *c*, and the rudder itself at *d*. Special reference to Figs. 1 and 5 will show the preferred relative positions of the rudder and its post with reference to the keel of the vessel and the propeller. If this rudder-post were

supported only at top, it would be liable to bend, the force of the water acting against the rudder tending to bend the post, as before stated. As the propeller-shaft is the strongest piece of metal at the stern of the vessel, I have devised a way of supporting the rudder-post by this shaft. In order to do this, I prolong the shaft, so that it will enter into the rudder-post, (see Figs. 4, &c.,) and revolve in a bearing there. This construction will prevent sidewise bending of the rudder-post, and, in order to prevent the rudder-post from bending backward, I apply to the propeller-shaft a sleeve, *e*, which is provided on its exterior with projecting rings *f f*, which sleeve revolves in a brass, *g*, set in the rudder-post, and secured by flanges from moving endwise therein. This brass may be made of any convenient form on the outside, and necessarily in two pieces, and is, with the sleeve, to be placed in the rudder-post (which is made in at least two pieces, as shown in the drawings) before the two pieces composing the post are riveted or bolted together. After these parts are in place the propeller-shaft is shoved out through the true stern-post, through the eye of the propeller, and into the sleeve, and keyed or otherwise secured therein, in preference, by a key, as at *h*. Under this construction the sleeve will revolve with the shaft in the brass, and the projecting rings on the sleeve, entering corresponding grooves in the brass, (see specially Figs. 4 and 10,) will prevent the brass, and consequently the rudder-post, from bending backward, unless the post carries the shaft endwise with it. This cannot happen, as the shaft is always provided with collars inside the ship, which prevent endwise motion of the former, and could not happen when the propeller was driving the ship ahead, even if there were no collars in the ship, because at that time the tendency of the propeller and its shaft is to move inward or forward.

In order to prevent a current of water carrying silt or sand from entering between the sleeve and its brass, I apply to the shaft itself, or preferably upon a prolongation of the sleeve, a collar, *j*, made in two pieces, as plainly shown in the drawing, and secured in place by flanges and grooves and two bolts, which unite the two halves of the collar into a whole after it is placed upon the sleeve. This collar revolves with the shaft, and has projecting rearward from it a ring, *k*, which overlaps the flange on the brass in the rudder-post. I prefer to make this ring separate from the collar, and to slip it into place after the collar is put into position, and secure the ring to the collar by screws. This collar may be made in one piece with the sleeve *e*, provided the key-slot *h* be cut through it.

This arrangement prevents a current of water from flowing between the rubbing-surfaces of the sleeve and the brass in the rudder-post, because there is a water-tight joint between the ring and the collar, and because the direction of the current is such that it does not flow practically between the ring and the brass in the rudder-post.

As an additional precaution, I close up the after end of the brass in the rudder-post, as seen at *m*, in consequence of which, even if a current should tend to enter at the front part of the brass, there could be no appreciable current passing through the brass. This closure or closing-piece of the after end of the brass may be cast with the parts of the brass, as shown in the drawings, or may be a separate piece of metal properly supported in position.

I intend to use the ring without the closing-piece and the closing-piece without the ring, but prefer to use both.

In order to prevent a current of water from entering the support of the propeller-shaft inside of the vessel, I apply to the stern-post a boss, *n*, bolted onto the true stern-post, and apply to its exterior, and overlapping the boss of the propeller, a ring, *o*, similar to the ring *k*.

In large vessels it may sometimes be useful to apply other support than the propeller-shaft, to prevent the bending of the rudder-post, although I do not think this will ever be necessary; but in case it becomes requisite, two braces, *p p*, attached at one end to the stern of the ship and at the other end and lower end to the rudder-post, will prevent bending of the post.

I sometimes intend to dispense with the sleeve and permit the surface of the propeller-shaft to bear in the brass in the rudder-post, and in such case apply to the end of the shaft behind the rudder-post a flange, whose forward surface will bear against the rear or after surface of the brass in the rudder-post. This flange is to be firmly secured to the shaft, and when the rudder-post tends to bend rearward such tendency will be resisted by this flange. This construction I regard as an inferior one.

The sleeve keyed to the propeller-shaft and the brass may be used without the devices for preventing currents of water from flowing between their rubbing-surfaces; but these devices as applied to the after end of the rudder-post, or to the front thereof, will be of little or no use, except when my plan of a rudder-post without a shoe connecting its lower end to the keel is employed, because the ordinary practice, when the shoe is employed, is to use a shaft so short that it will not enter the rudder-post.

I claim as of my own invention—

1. The combination of a propeller-shaft with the rudder-post of a vessel, the two being connected substantially in the manner described, so that the shaft prevents the bending of the rudder-post, in the manner specified.

2. In combination with a propeller-shaft, a sleeve secured thereon, and a rudder-post, a brass in the rudder-post, the three being so

made and combined, substantially as specified, that the shaft prevents the bending of the post, as set forth.

3. A ring, in combination with the shaft and the rudder-post, so applied, substantially as described, between the propeller and the front part of the rudder-post, that said ring shall operate to prevent currents of water flowing between the rubbing-surfaces inclosed in the rudder-post.

4. In combination with the rudder-post, the metallic closing-piece which shuts up the after end of the brass in the rudder-post, said piece being made and operating substantially as described.

5. The ring applied between the propeller and the stern-post, in combination with the hub of the propeller and a boss upon the stern-post, substantially in the manner and for the purpose set forth.

JOHN BAIRD.

Witnesses:
M. E. STOBO,
A. J. BAIRD.