

(No Model.)

3 Sheets—Sheet 1.

J. I. THORNYCROFT.

STEERING APPARATUS FOR VESSELS.

No. 343,679.

Patented June 15, 1886.

Fig. 1.

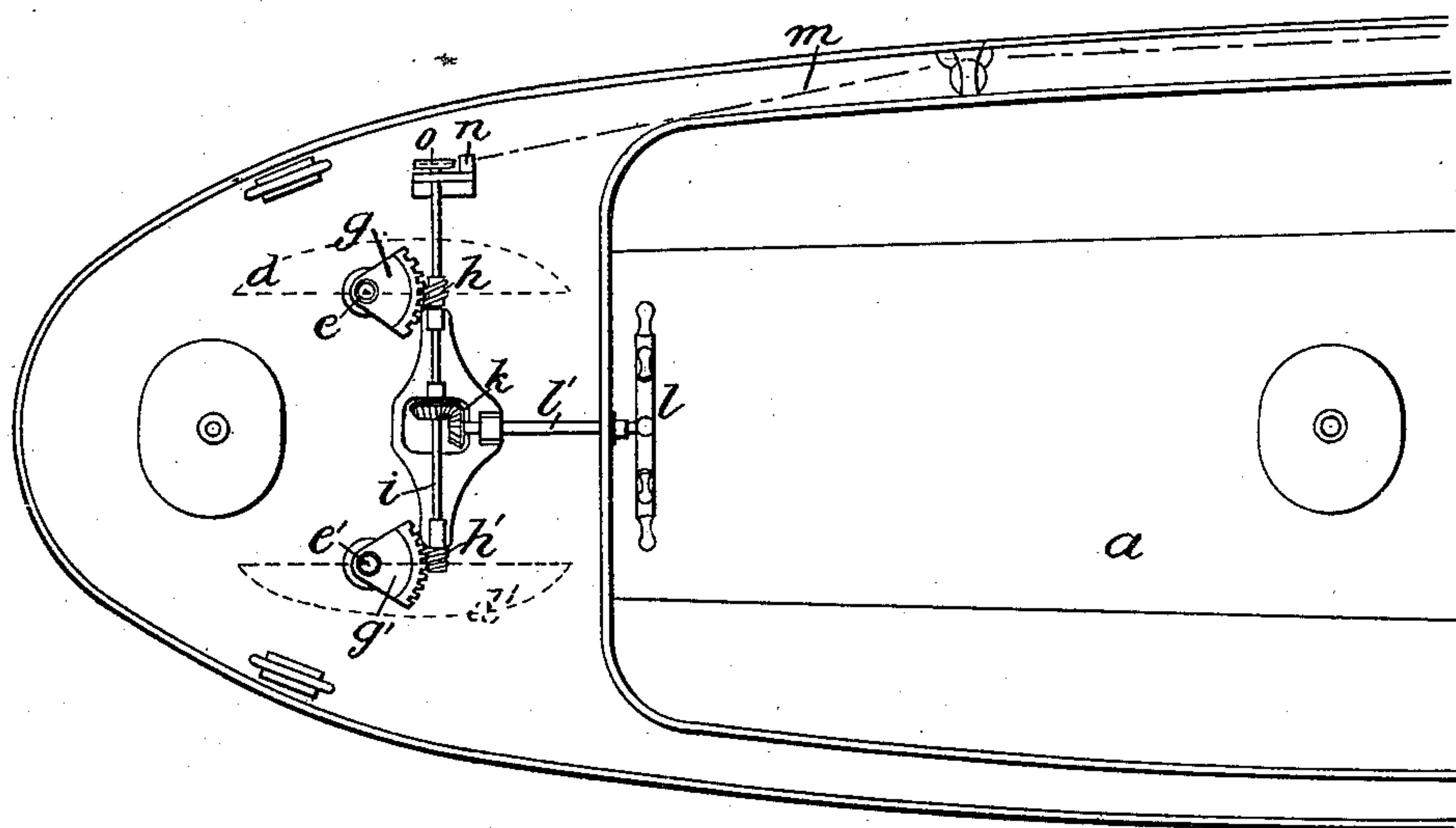
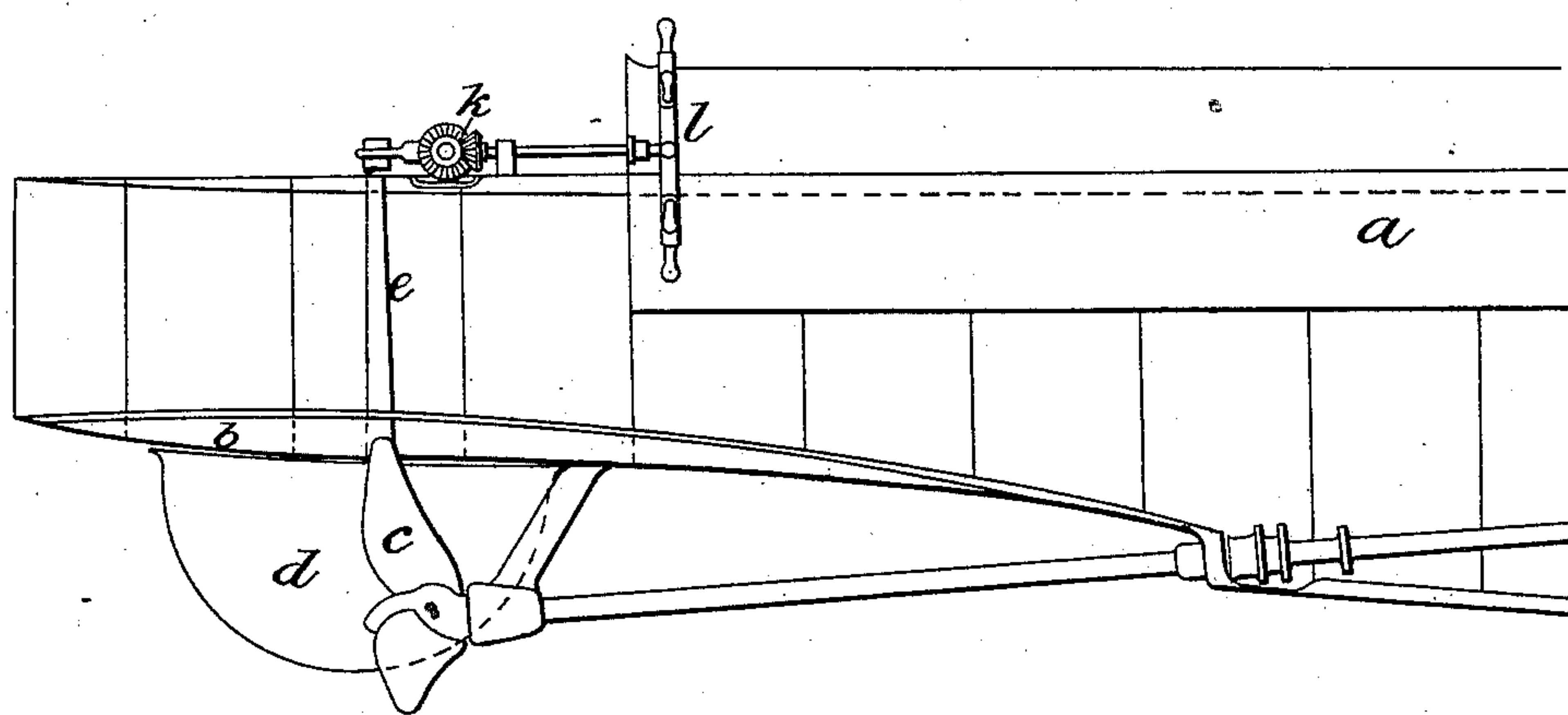


Fig. 2.



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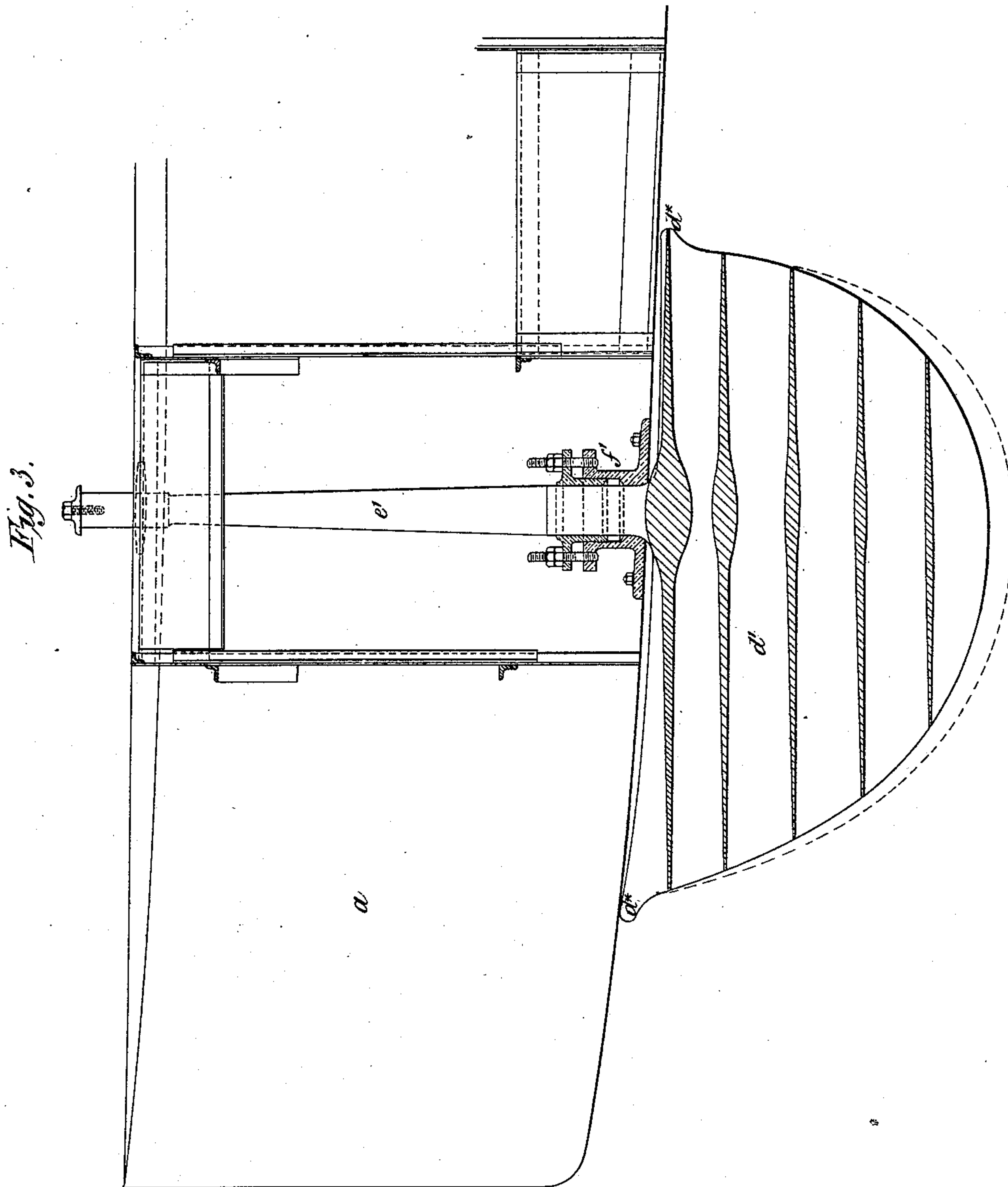
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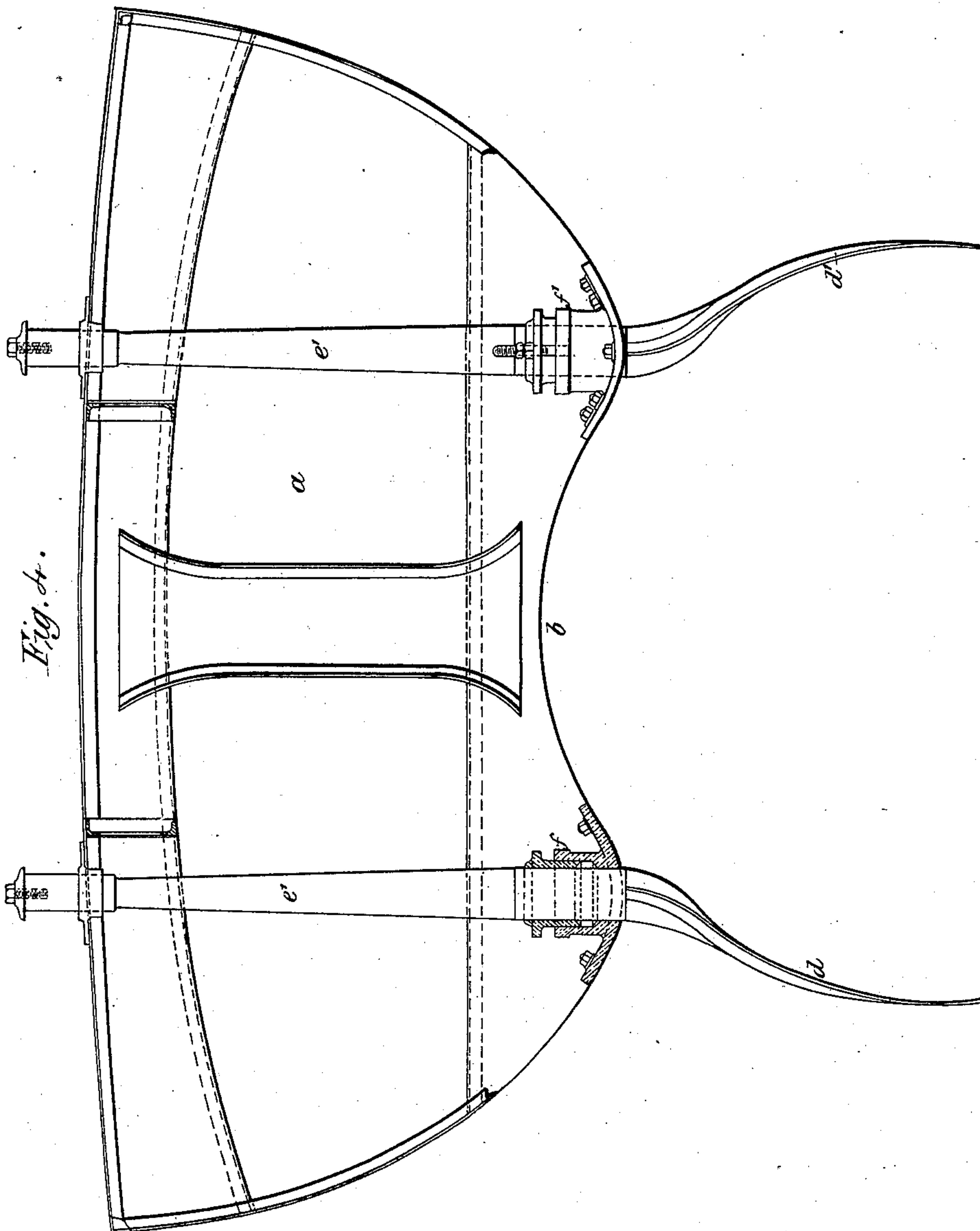
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UNITED STATES PATENT OFFICE.

JOHN ISAAC THORNYCROFT, OF CHISWICK, COUNTY OF MIDDLESEX,
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STEERING APPARATUS FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 343,679, dated June 15, 1886.

Application filed October 20, 1885. Serial No. 180,400. (No model.) Patented in England February 14, 1885, No. 2,043; in France October 7, 1885, No. 171,531; in Sweden October 13, 1885, No. 341; in Canada October 28, 1885, No. 22,695, and in Italy December 31, 1885, No. 427.

To all whom it may concern:

Be it known that I, JOHN ISAAC THORNYCROFT, a subject of the Queen of Great Britain and Ireland, residing at Chiswick, in the county of Middlesex, Kingdom of Great Britain and Ireland, have invented new and useful Improvements in Navigable Vessels and their Steering Apparatus, of which the following is a specification.

10 This invention relates to improvements in navigable vessels and their steering apparatus, and has for its object to enable such vessels to be readily steered when going either ahead or astern.

15 According to this invention the dead wood at the stern or propeller end of the vessel is more or less cut away, the remaining portion being hollowed out to partially receive the propeller or propellers. At each side of the
20 propeller is provided a rudder, which may advantageously be made of a form resembling in cross-section a circular arc, the rudder-heads being so arranged and supported that the rudders may be operated for steering purposes
25 without liability of their coming into contact with the propeller or propellers or its or their carrying frame or frames. With the above-described construction and arrangement a vessel may be readily steered, whether going ahead
30 or astern, and it will be understood that the propeller will be wholly immersed in water, although the water-line of the vessel may be below the top of the propeller-blades.

Referring to the accompanying drawings,
35 Figure 1 shows in plan the stern portion of a vessel with my invention applied to it. Fig. 2 is a corresponding longitudinal vertical section. Figs. 3 and 4 are to a larger scale, and show, respectively, a side elevation, partly in
40 section, of a portion of the stern of the vessel with a rudder-head, and horizontal sections at different points of a rudder-blade, and a transverse section showing the form of the bottom of the vessel near the stern, and the arrange-
45 ment of the two rudders between which the propeller or propellers (not shown) is or are situate.

a is the hull of the vessel.

b is the hollow portion intended to partially receive the propeller *c* or propellers.

50 *d d'* are rudders arranged one at each side of the propeller or propellers. Each rudder, as here shown, is of a form resembling in cross-section a circular arc. (See Fig. 4.) Horizontal sections through the blade at various
55 points in its length are shown in the lower part of Fig. 3. The dotted lines at the bottom of Fig. 3 indicate the shape of the plate that forms the rudder before it has been bent to the arc-like form already mentioned.

60 In the arrangement illustrated each rudder-head *e e'* extends upward through a stuffing-box, *f f'*, and at its upper part is provided with a toothed sector, *g g'*, in gear with a worm, *h h'*, on a transverse shaft, *i*, operated
65 by bevel-gear *k* from the shaft *l'* of the steering-wheel *l*. The bevel gear-wheel on the shaft *l'* is arranged to be thrown in and out of gear with the bevel gear-wheel on the shaft *i* by mounting the shaft *l'* so as to be capable of
70 endwise movement in its bearings; or the shaft *i* may be rotated for steering purposes by a chain, *m*, actuated by a steering wheel or apparatus. (Not shown.) For this purpose the chain *m* is passed through a fair lead or guide,
75 *n*, and then round the chain-wheel *o* on the shaft *i* and back to the steering apparatus. When the chain *m* is used, the bevel-gear *k* should be thrown out of gear. The rudders
80 may, however, be operated in any other convenient manner. They may be provided with curved portions at *d* d**, having for their object to deflect floating bodies that may strike these parts, in order to prevent such bodies becoming wedged between the rudders and
85 the hull of the vessel.

I do not herein claim a single rudder arranged on one side of the propeller, as I make this the subject of a separate application filed November 25, 1885, Serial No. 183,915.

What I claim is—

1. In a navigable vessel, the combination, with a propeller or propellers, of a rudder at each side thereof projecting or extending
95 above and below as well as forward and abaft of said propeller, substantially as described.

2. A navigable vessel constructed with an external hollow or recess at the under part of the stern, and having a propeller or propellers arranged to revolve in or partly in said
5 recess, in combination with a rudder situated abreast of said propeller or propellers on each side, substantially as described.

3. In a navigable vessel, the combination, with a propeller or propellers, of a rudder at
10 each side thereof, which rudder in transverse

section has the form of an arc of a circle practically concentric with the said propeller or propellers, substantially as described.

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