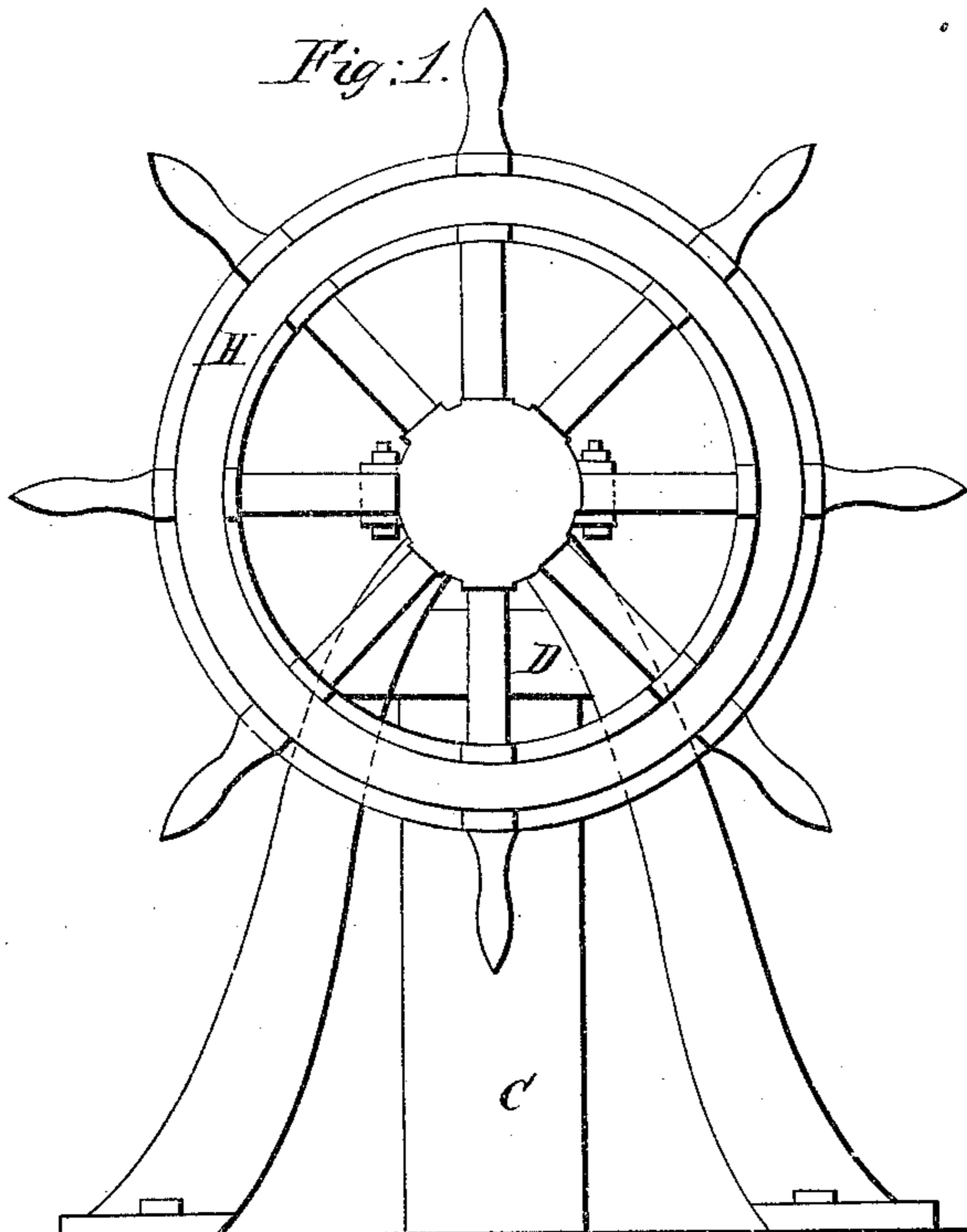


*H. Higgins.*  
*Steering.*

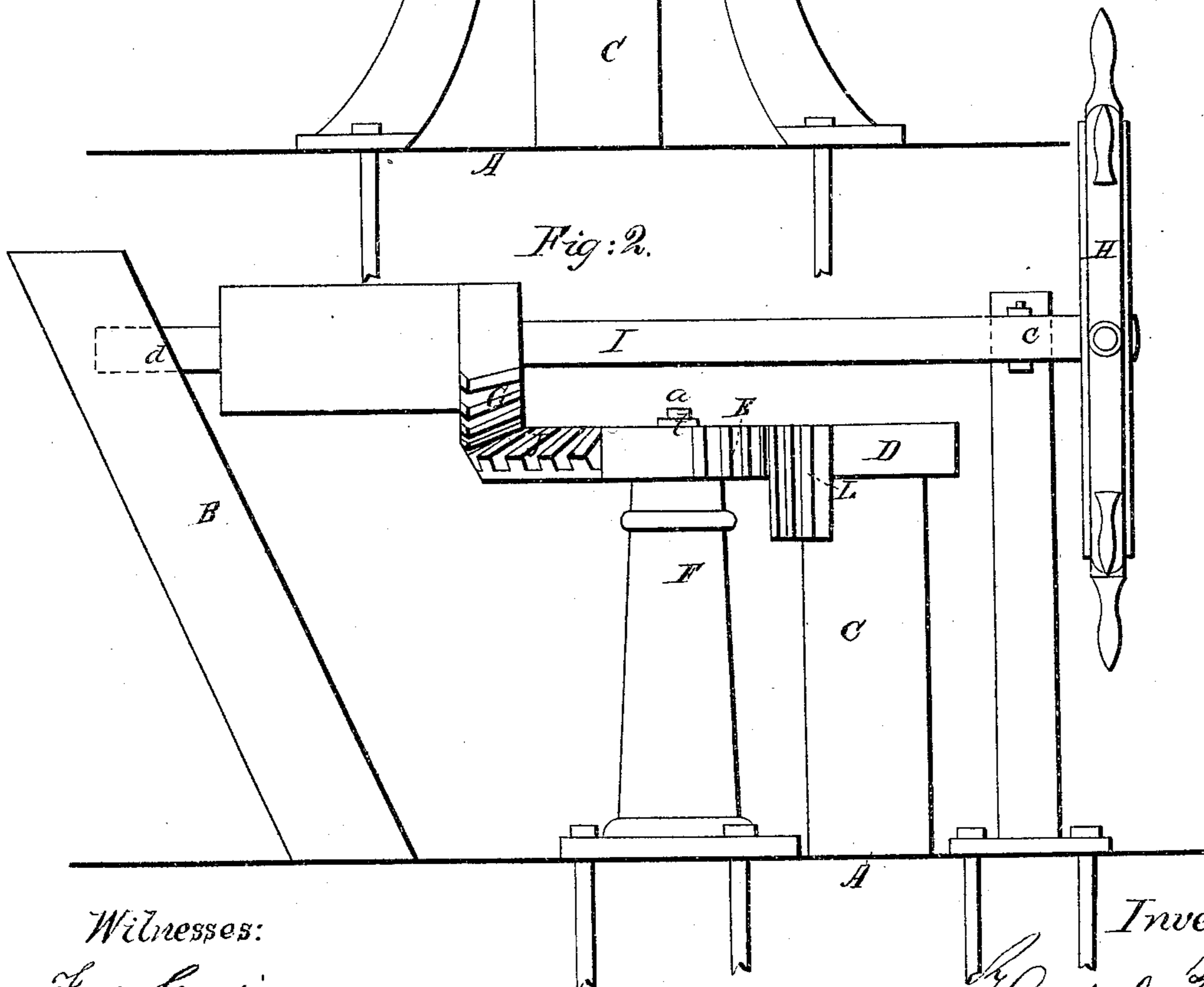
*N<sup>o</sup> 25,734.*

*Patented Oct. 11, 1859.*

*Fig: 1.*



*Fig: 2.*



*Witnesses:*

*Geo. Curtis*  
*W. P. Hall*

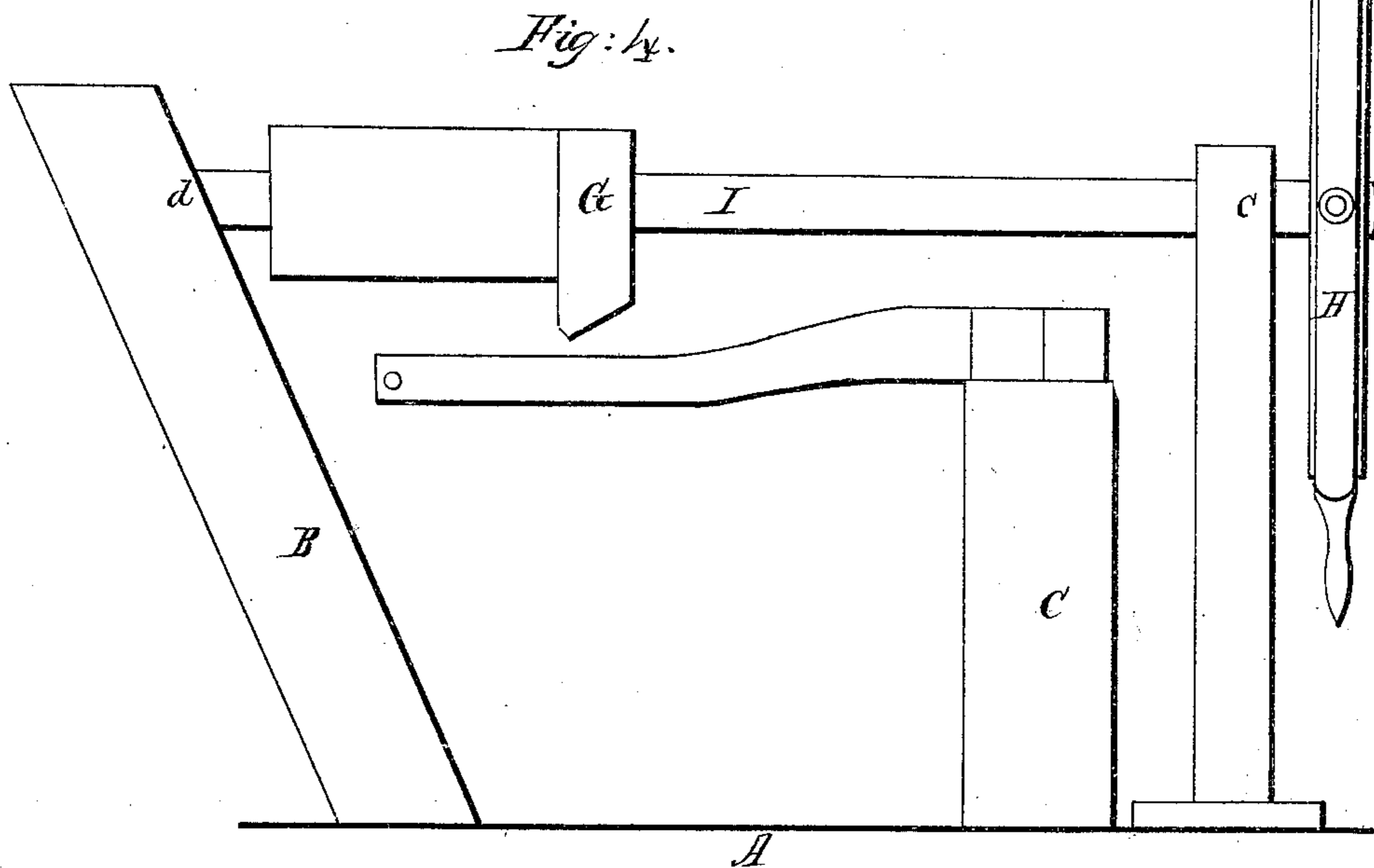
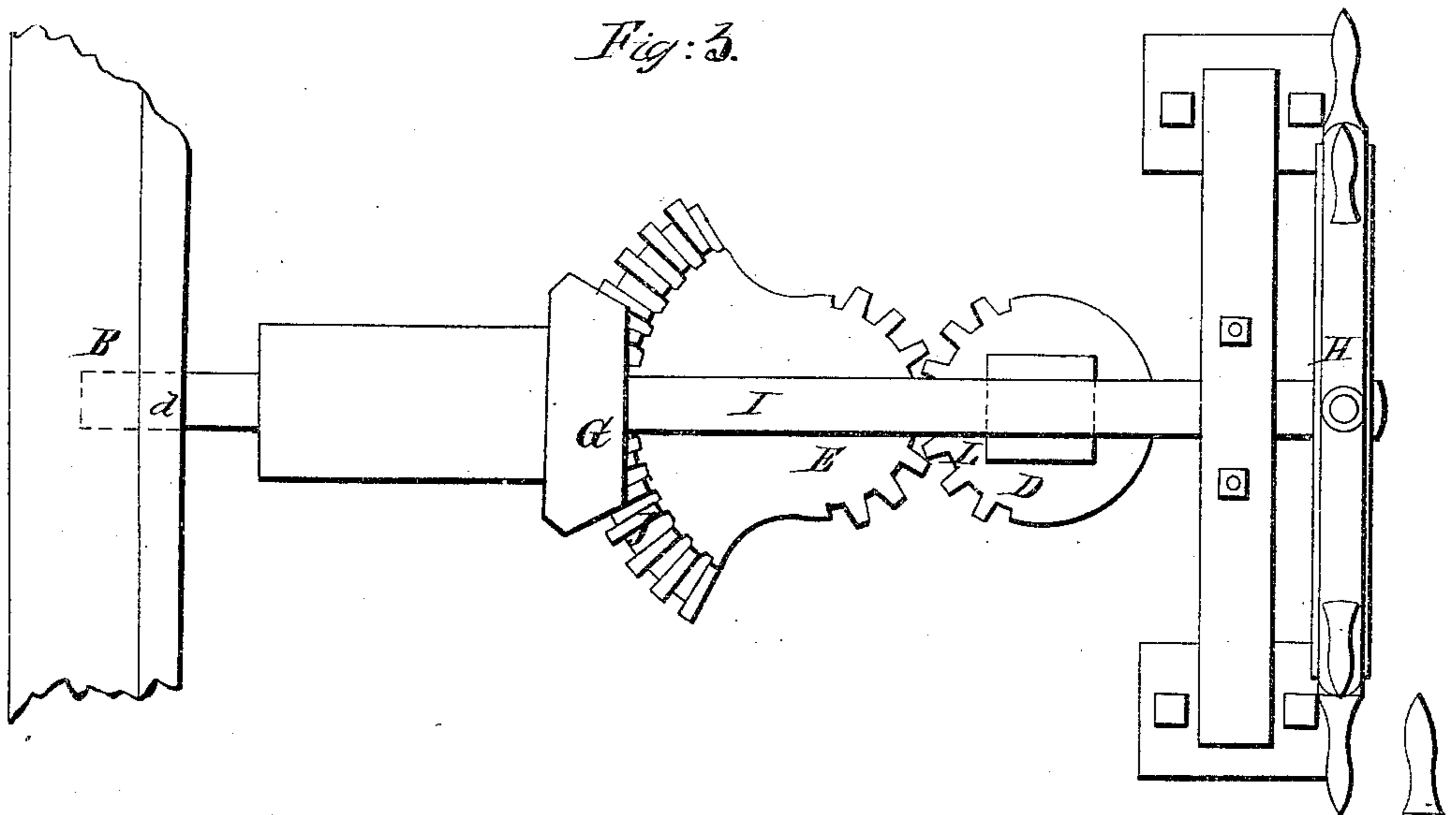
*Inventor:*

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*N<sup>o</sup> 25,734.*

*Patented Oct. 11, 1859.*



*Witnesses:*  
*Fred. Curtis*  
*W. P. Hale Jr*

*Inventor:*  
*Hazel Higgins*

# UNITED STATES PATENT OFFICE.

HATSEL HIGGINS, OF ORLEANS, MASSACHUSETTS.

## STEERING APPARATUS.

Specification of Letters Patent No. 25,734, dated October 11, 1859.

*To all whom it may concern:*

Be it known that I, HATSEL HIGGINS, of Orleans, in the county of Barnstable and State of Massachusetts, have invented a new and useful or Improved Steering Apparatus; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1 denotes a front elevation, Fig. 2 a side elevation, and Fig. 3 a top view, of such apparatus.

It is a fact well known that a good and effective steering apparatus is a desideratum which has long been sought for, that millions of dollars and thousands of valuable lives have been lost through the inefficiency of the different kinds of devices heretofore employed.

To find a remedy for the defects existing in almost all the apparatus heretofore used has been the special object of my invention, the nature of which consists in the peculiar construction and arrangement of the operative parts of a steering apparatus, such parts consisting of a spur and bevel gear connecting wheel (supported in manner as will be hereinafter described) a bevel gear and a spur gear applied to the hand wheel shaft and the rudder head respectively, such construction and arrangement being such as not only to allow of great rapidity and facility in changing the course of a vessel but of permitting the rudder head to rise without any danger of disengagement of the gears or injury thereto in case the after part of a vessel should strike upon a ledge or get into shoal water.

In such drawings A, denotes a portion of the deck, B, a part of the stern of a vessel with my apparatus applied thereto; C, represents the rudder head as projecting above the said deck, and from or near its central part, the said rudder head being allowed to freely revolve in the deck in the usual manner. On the top or upper part of the said rudder head a metallic cap D, is placed, the same having a sectoral spur gear L, formed on its periphery as shown in Figs. 2 and 3. The width of such sectoral part, or the length of the teeth formed upon it, is somewhat greater than the width of the spur gear wheel E, with which it engages, such being so constructed in order to permit the rudder head to rise without throwing its gear out of engagement with the connecting

gear. The said wheel E, is supported and so as to be capable of freely rotating horizontally upon a vertical standard, F, which rises from the deck and is firmly secured thereto by means of a collar and bolts as shown in Fig. 2, or in any other proper manner so as to admit of being readily removed therefrom in case of breakage or injury to the said wheel; such wheel E, being confined to the top of the standard F, by means of a screw *a*, and a washer *t*, as shown in the drawings, or in any other proper manner, such screw serving as an arbor or shaft on which said wheel may revolve. Furthermore the said wheel E, has not only a sectoral gear made vertically upon one side of it, but also has a horizontal sectoral bevel gear J, formed upon its opposite side, such bevel sector having a radius of about double that of the vertical gear and being concentric therewith. This last mentioned bevel gear engages with a bevel sector or sectoral gear G, fixed upon the handwheel shaft I, as shown in the drawings. The said shaft I, not only carries the gear G, but also a hand wheel H, and is supported in stationary bearings *c*, *d*, the former of which is made on the top of an A shaped frame while the latter is fixed to the stern as shown in the drawings.

It is evident that when the steering wheel is turned so as to put its shaft in revolution, a movement either toward the right or the left will be communicated to the rudder by means of the train of gears before described.

In case an accident should happen to the above mentioned gears, I have so constructed and arranged them, that I can readily remove such as may be necessary and apply the tiller to the rudder head in the place thereof as shown in Fig. 4.

From the above it will be seen that my apparatus is not only very simple in construction, but very little liable to get out of order during rough weather at sea or while a vessel is being driven upon a reef or shoal, and besides that it possesses many advantages over most if not all other apparatus of a like character.

The intermediate position of the rudder operating gear between the rudder head and the stern of the vessel enables the hand wheel to be arranged "close aft" and in immediate proximity to the rudder head, which economizes deck space in front of the steering apparatus and gives an advantageous

compactness to the whole. Also by such arrangement, and the extension of the hand wheel shaft clear to the stern, every facility is afforded for working the rudder by a  
5 temporary tiller rigged thereon or fitted thereto as shown in Fig. 4, and operated by a rope or chain from a barrel on the hand wheel shaft, whenever breakage or removal of the regular operating gear makes a sub-  
10 stitute desirable or necessary.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is,

15 The arrangement, substantially as specified, of the rudderhead, intermediately be-

tween the supports, which respectively serve as bearings to the handwheel shaft and the rudder operating gear, said shaft extending back of and over said gear, whereby the rudder may be operated either by the gear or by  
20 a tiller from the wheel shaft as described, and also compactness of the steering apparatus and economy of deck space is obtained.

In testimony whereof I have hereunto set my signature this 18th day of June A. D. 25  
1859.

HATSEL HIGGINS.

Witnesses:

ARTHUR NEILL,  
F. P. HALE Jr.