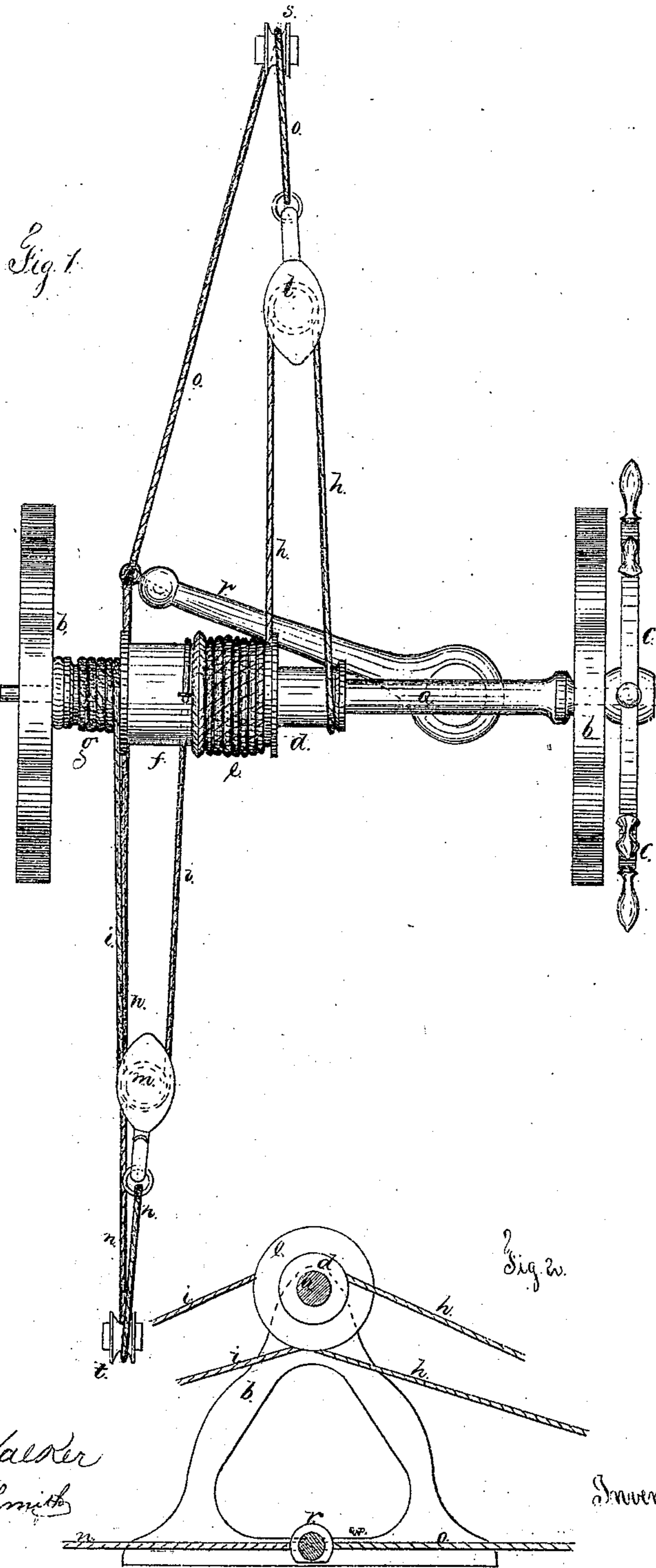


E. Fox.

Steering.

No. 98,241.

Patented Dec. 28, 1869.



Witnesses,

Geo. A. Walker  
Chas. Smith

Inventor,

Edward Fox  
per L. W. Perrell  
Atty

# United States Patent Office.

EDWARD FOX, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND JOSEPH J. WALTON, OF SAME PLACE.

*Letters Patent No. 98,241, dated December 28, 1869.*

## IMPROVEMENT IN STEERING-APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, EDWARD FOX, of the city and State of New York, have invented a new and useful Improvement in Steering-Apparatus; and I do hereby declare the following to be a correct description of the same.

Before my invention, a steering-apparatus has been made containing two conical barrels, from which chains pass in opposite directions to the rudder or tiller. In this character of apparatus, difficulty arises in keeping the chain or rope from becoming slack on one side or the other, and allowing the rudder to move, if struck by a wave.

The object of my invention is to move the tiller or rudder by the action of differential barrels, to which the ends of the chains are attached, so that the motion in either direction results from winding the chains from a smaller to a larger barrel, and the reverse.

The speed of movement depends upon the relative sizes of the barrels, and the movement is uniform, and slack chain is prevented.

In the drawing—

Figure 1 is a plan view of my apparatus, and

Figure 2 is an elevation of the barrels, endwise, the shaft being in section.

The shaft *a* is supported in suitable bearings, *b b*, and provided with the hand-wheel *c*.

Said shaft *a* also carries the barrels *d*, *e*, *f*, and *g*.

These barrels are made of suitable material, and the barrels *e* and *f* are of greater diameter than the barrels *d* and *g*.

The chain *h* has its ends attached to the barrels *d* and *e*, and the chain *i* has its ends attached to the barrels *f* and *g*.

The chains *h* and *i* pass respectively through the blocks *l m*, at the ends of the tiller-ropes or chains

*n o*, passing through the blocks *s t* to the tiller *r* or rudder-head, in any convenient manner.

The chains *h* and *i* pass off in opposite directions from the points of attachment to the respective barrels, so that when the shaft *a* is revolved in one direction, the loop of chain *i* passing through the block *m* will be lengthened, in consequence of the movement unwinding the chain from the larger barrel and winding it upon the smaller barrel *d*. At the same time the loop of chain *h*, passing through the block *l*, will be correspondingly shortened, by being wound upon the larger barrel *f* as it is unwound from the smaller barrel.

During these movements the chains reeve through the respective blocks, and the blocks themselves are moved, drawing the rudder to one side or the other.

In this apparatus the parts can be easily proportioned to the duty to be performed, for, when the barrels are nearly of the same size, the movement of the rudder will be slow and correspondingly powerful, and, if the barrels vary considerably in size, the motion will be more rapid, and the helmsman have less leverage over the rudder.

What I claim, and desire to secure by Letters Patent, is—

The barrels *d*, *e*, *f*, and *g*, of two different sizes, to which the chains *h* and *i* are connected, in combination with the blocks *l*, *m*, *s*, and *t*, that are connected to the rudder, the parts being arranged and operating substantially as set forth.

In witness whereof, I have hereunto set my signature, this 7th day of October, A. D. 1869.

EDWARD FOX.

Witnesses:

GEO. D. WALKER,  
GEO. T. PINCKNEY.