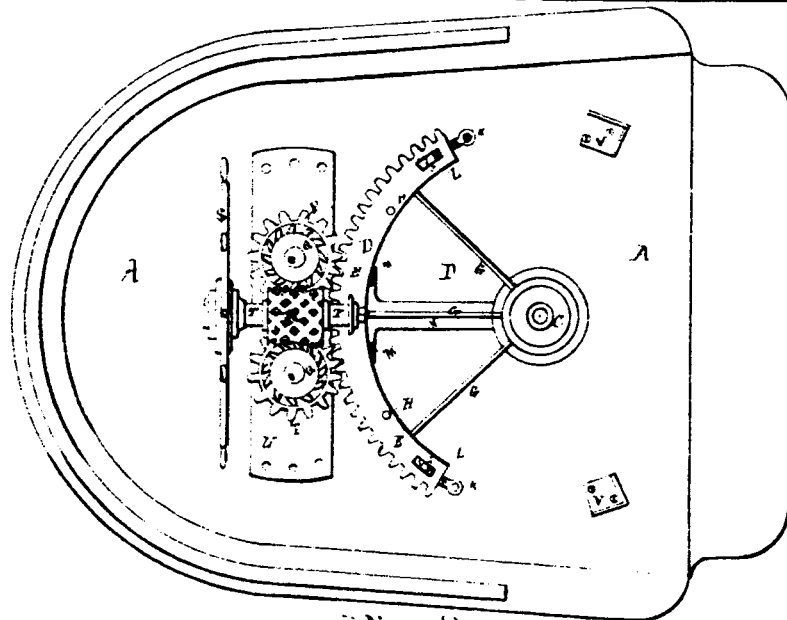
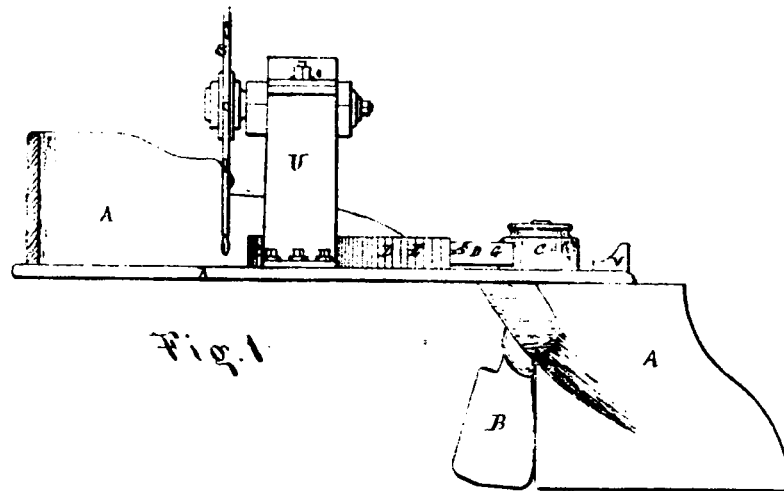


2 Sheets, Sheet 1.

*T. C. Furrington,*  
*Steering Apparatus.*  
*No. 107,719. Patented Sept. 27, 1870.*



**Witnesses:**  
*Thomas H. Smith*  
*J. B. Moore*

**Inventor:**  
*T. C. Furrington*  
*Attest, not a lawyer, Geo. S. Hallatt*  
*By C. W. M. Smith, not. pub.*

T. C. Purington,

2 Sheets, Sheet 2.

Steering Apparatus.

No. 107,719.

Patented Sept. 27, 1870.

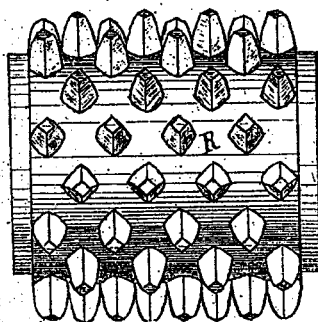


Fig. 3

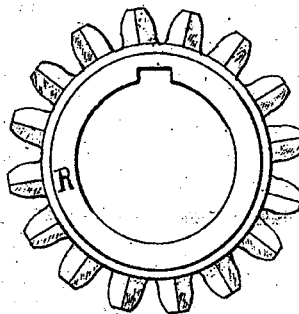


Fig. 4

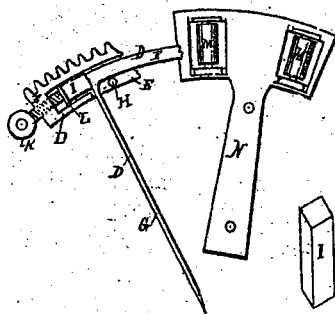


Fig. 5 Fig. 6 Fig. 7

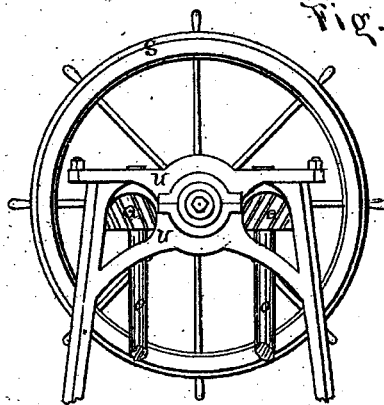


Fig. 8

**Witnesses:**

David A. Smith  
J. B. Moore

**Inventor:**

Twena C. Purington  
Assignor to himself & H. H. Mallett  
By Wm. Smith his Atty

# United States Patent Office.

TURNER C. PURINGTON, OF VALLEJO, CALIFORNIA.

Letters Patent No. 107,718, dated September 27, 1870.

## 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, TURNER C. PURINGTON, of Vallejo, in the county of Solano and State of California, have invented certain new and useful Improvements in Steering Apparatus for Ships; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to certain improvements in the gearing, by which the rudders of ships are made subject to the control of the helmsman.

The rudder of a ship in a sea-way, constantly coming in violent contact with the water, and the water impinging upon the rudder with very great force, and in continually-changing directions, and the head of the rudder being generally connected rigidly to the tiller, and the tiller to the steering-wheel by inelastic gearing or ropes, so great a strain is frequently brought upon the parts by the quick and jerking motion produced by the violent action of the water, that the rudder-head becomes twisted or broken off, and the ship consequently disabled, or the helmsman is thrown violently away from or injured by the steering-wheel or tiller, or some other part of the gearing gives way to relieve the strain thus brought upon it.

The object of my invention is, first, to provide against the above-mentioned disastrous effects of the said violent action of the water upon the rudder.

My invention consists, first, of the employment for this purpose, in the steering apparatus of ships, of India-rubber cushions or springs, in a manner hereafter fully set forth and described.

The second object of my invention is to provide an improved mechanical movement for communicating motion from the steering-wheel to the rudder; and

My invention further consists in the employment, for this second purpose, of a toothed segment of a wheel attached to the head of the rudder, into which work two spur-pinions, keyed to vertical and parallel shafts, caused to move simultaneously in either direction by means of spur-wheels attached to their upper ends, having the teeth upon their periphery at an angle to their axes, or to the respective axes of the vertical shafts, to the upper extremities of which they are keyed, and receiving motion from the horizontal shaft of the steering-wheel by means of my newly-invented toothed cylinder, or right and left-handed screw.

In the accompanying drawing—

Figure 1, sheet 1, is a side elevation of a steering apparatus embodying my invention.

Figure 2, sheet 1, is a plan of the same, with certain parts of the frame removed for the purpose of showing the arrangement of the gearing.

Figures 3 and 4 are, respectively, a side and end

view, on an enlarged scale, of the toothed cylinder or right and left-handed screw.

Figures 5, 6, 7, and 8, are details.

Like letters refer to like parts in all of the figures.

A is the ship's stern.

B is the rudder, and

C, the rudder-head.

D, the toothed segment, consisting of the arc or case E, the rim F, the arms G, and other parts, as shown and hereinafter described.

The arms G are rigidly secured to the rudder-head, and connected, at their outer extremities, to each other by the rim F.

The rim F is secured in a recess in the arc or case E, by means of the pins H and the rubber cushions or springs I. These springs are introduced into the arc through openings J, made for that purpose. In order to introduce them, the screws K are withdrawn so as to clear the opening, and after the insertion of the rubber, the said screws are driven inward, forcing the plates L against the springs, and causing the springs to bear against the end face of the rim F.

M are friction-rollers, fixed on the plate N, to even the arc E.

O are the parallel vertical shafts, to the lower ends of which are attached the pinions P, and to the upper ends of which are secured the spur-wheels Q.

The teeth of pinions P engage with the teeth of the arc, and being two in number, twice as many points of contact between the faces of the teeth are secured as would be obtained with one pinion.

The teeth upon the wheels Q are at an angle to their axes, each wheel being substantially a multi-threaded screw, the teeth forming the thread. In order that both may be caused to turn in the same direction by the toothed cylinder R, one is right and the other left-handed.

S is the steering-wheel, and

T, the steering-wheel shaft, to which the cylinder R is keyed.

U is the frame.

I will now proceed to explain the principle and describe the method that I prefer for producing the toothed cylinder R.

I take a cylinder previously bored and turned, and of such an outside diameter as will allow of forming the teeth by cutting away the metal, and convert it first into a multithreaded right-handed screw, similar to the right-handed screw K, or what is the same thing, into a spur-wheel, having the teeth upon its periphery at such an angle with its axis that it will engage with the teeth of one of the wheels Q, and with said wheel Q form a pair that would communicate motion from the steering-wheel shaft T to one of the vertical shafts O.

Now, to aid this explanation, I will assume that I

next fill the spaces between the teeth or threads just cut with soft solder, and thus restore the cylinder to its original shape and appearance; then proceed and cut through solder and iron, and convert the cylinder into a multithreaded left-handed screw or spur-wheel, having its teeth at such an angle with its axis that it will engage with the teeth of the other or second wheel Q.

With this explanation, it is evident that the threads last formed will consist partly of solder and partly of the solid iron, and that the iron is a part of both the first and the last formed threads; and if I now melt out the solder the iron will remain, and be found to have the character of and constitute the teeth, as shown in figs. 3 and 4, sheet 2, and these teeth, upon trial, will be found to answer the purpose of full and perfect threads, and will impart motion simultaneously to both the wheels Q in either direction.

It is evident that this toothed cylinder may be of any length, even so short that it would contain only a simple circle of teeth, and still operate substantially in the manner described; and it is also evident that the wheels into which it works may be of any diameter. If of an infinite diameter they become racks to each other, and would have a motion in opposite directions, and in a plane parallel with the axis of the toothed cylinder; and this last part of my invention may be applied to any purpose where such a mechanical movement is required.

When applied to large ships, for the teeth of the segment D, I prefer to substitute wooden cogs, for the purpose of obtaining a smoother and more noiseless action.

When the helm is hard up or hard down the screws

K will come in contact with one or the other of the stops V.

The cushions or springs I may be placed in a case close to and surrounding the head of the rudder, and would undoubtedly be equally effective for the purpose set forth, to wit, of preventing disastrous results from the violent action of the water against the rudder at whatever distance they may be placed from the center of motion of the rudder, provided they are properly proportioned to correspond to that distance.

Having thus described my invention,

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

1. The toothed cylinder R, substantially as described and for the purpose set forth.

2. The toothed cylinder R, in combination with the wheels Q, substantially as described and for the purpose set forth.

3. The cylinder R, wheels Q, pinions P, and toothed segment D, combined and arranged substantially as described, and for the purpose set forth.

4. The employment, in the steering apparatus of ships, of India-rubber springs or cushions, J, substantially as described and for the purpose set forth.

5. For the purposes hereinbefore set forth, the toothed segment D, consisting substantially of the arc E, rim F, arms G, springs I, plates L, screws K, and pins H, as described, or their equivalents.

In witness whereof I have hereunto set my hand and seal.

TURNER C. PURINGTON. [L. S.]

Witnesses:

O. W. M. SMITH,

DAVID B. SMITH.