

J. F. Rochow,
Steering.

N^o 39,752.

Patented Sept. 1, 1863.

Fig. 1.

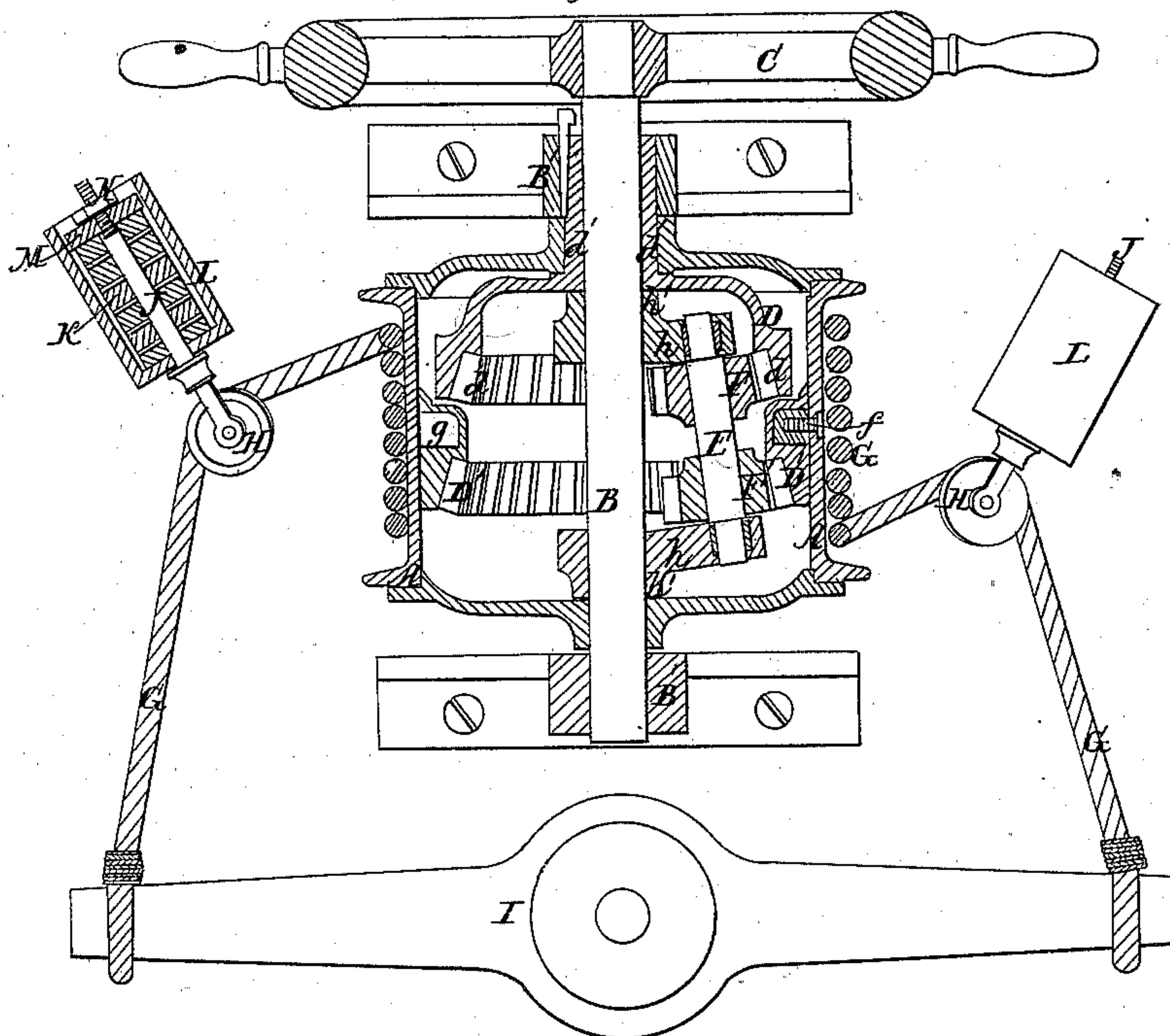
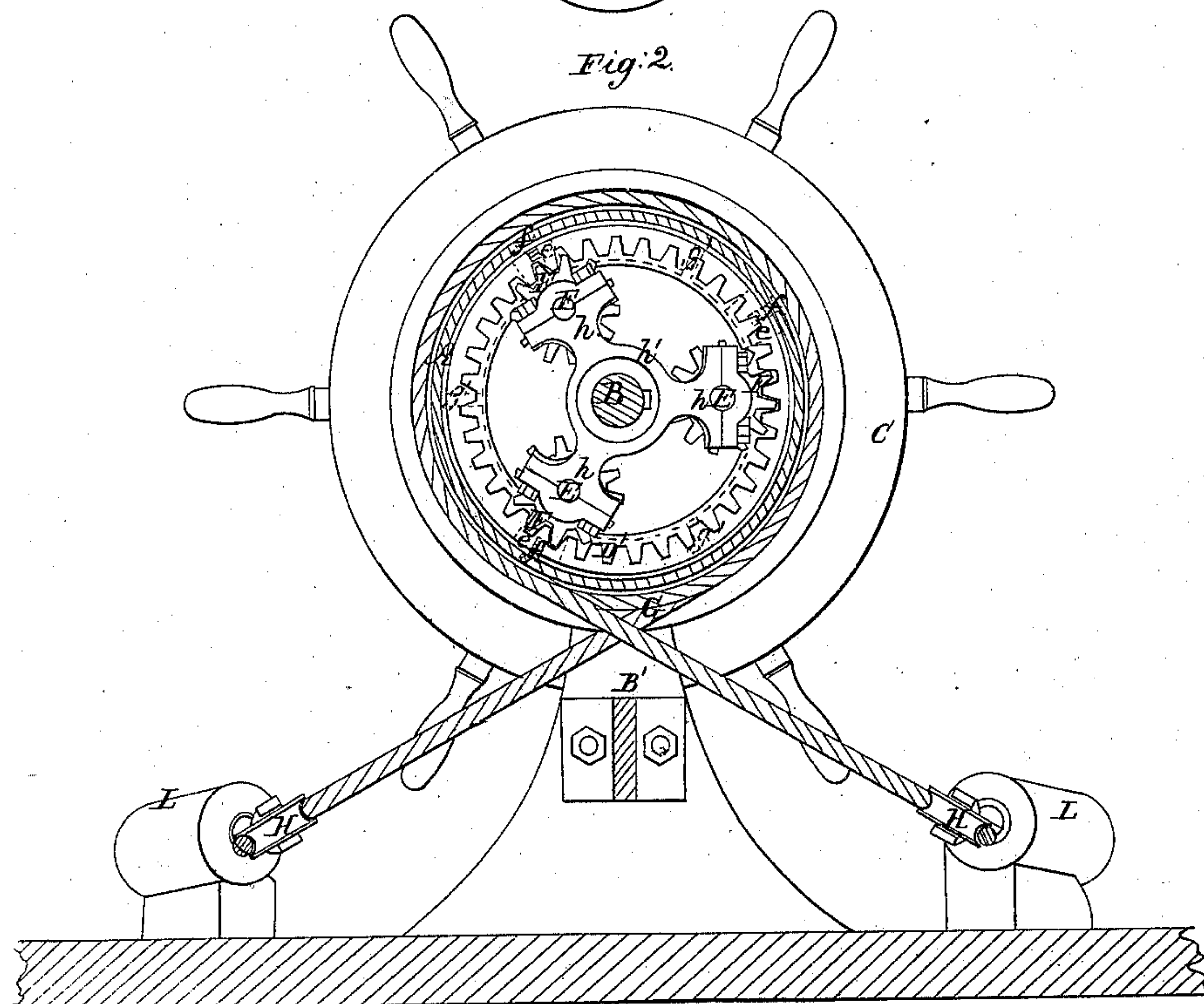


Fig. 2.



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IMPROVED STEERING APPARATUS.

Specification forming part of Letters Patent No. 39,752, dated September 1, 1863.

To all whom it may concern:

Be it known that I, JULIUS FERDINAND ROCHOW, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Steering Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a horizontal section of my invention. Fig. 2 is a transverse vertical section of the same.

Similar letters of reference in both views indicate corresponding parts.

This invention consists in the arrangement of a differential gear on the shaft of a steering apparatus, in combination with the steering-wheel and with the tiller or rudder, in such a manner that by said gear the transmission of motion from the drum backward to the steering-wheel is rendered impossible, and consequently the sudden jerks of the rudder have no influence on the wheel, and, furthermore, the power exerted by the helmsman on the wheel can be multiplied at pleasure.

The invention consists, also, in the arrangement of one or more springs of india-rubber or other suitable material in the interior of the drum of a steering apparatus, and in combination with the internal gear and with the tiller or rudder, in such a manner that the strain on the rope and other parts of the apparatus, caused by the sudden jerks of the rudder, is intercepted by said spring or springs, and damage to the different parts of the apparatus and to the rudder from that cause is prevented.

The invention consists, finally, in the arrangement of two adjustable spring-blocks or spring-pulleys, in combination with the rope and drum of a steering apparatus, in such a manner that by said spring-blocks a portion of the strain caused by the sudden jerks of the rudder is intercepted and the rudder is permitted to yield more or less to the force of the waves without damage to any part of the apparatus.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

A represents the drum on which the rope or chain winds, which governs the position of

the rudder. This drum may be made of cast-iron, wood, or any other suitable material, and it turns loosely on the shaft B, which has its bearings in standards B', and to which the steering-wheel C is firmly attached. The drum A is hollow, and a cog-wheel, D, with an internal gear, *d*, is firmly secured in its interior. This cog-wheel is provided with a hub, *d'*, which projects through the end of the drum, and which is firmly keyed to one of the standards B', being bored out to fit to the shaft B and turned off on its outside to form a good bearing for the drum, so that said drum is free to rotate while the cog-wheel D remains stationary.

D' is an internal gear or a rim provided with teeth on its inside and turned off so that it fits nicely into the drum. It is prevented from rotating independent of the drum by three (more or less) stops, *e*, which are secured to the inner surface of the said drum by screws *f*, and which project into a groove, *g*, turned into the rim D'. This groove is provided with three (more or less) abutments, *g'*, and if the spaces between the abutments and stops *e* would be left empty the drum, impelled by the sudden jerks of the rudder, would fly in either direction, bringing the stops alternately in contact with the abutments on either side; or if the rim D' would be rigidly attached to the drum the sudden motions of the rudder would cause an equally sudden jar of the cogs, rendering them liable to break or get out of order. To avoid these disadvantages, the spaces between the abutments and stops are filled out with india-rubber or other elastic material, and by these means the cogs of the gear-wheels are saved from injury.

E E are tumbling-shafts, which have their bearings in arms *h*, projecting from hubs *h'*, that are firmly keyed to the shaft B. These shafts carry pinions F F', the pinions F to gear into the cog-wheel D, and the pinions F' to gear into the cog-wheel D'.

I have applied three tumbling-shafts to increase the strength of the apparatus, and I have described an internal gear which will give satisfaction in practice, and which has been tried; but I want to be distinctly understood that I do not wish to confine myself to this peculiar gear, as the same may be varied and still produce the same effect.

G is the rope, which is fastened in the mid.

dle of its length to the surface of the drum, and the ends of which, after having been wound several times around the drum, extend through blocks H, and are secured to the tiller I or to the chain which extends to the rudder. The blocks H are firmly connected to spindles J, which are exposed to the action of springs K, so that said blocks can yield and accommodate themselves to the sudden motions of the rudder.

The springs K may be made of india-rubber and inclosed in barrels L, and a follower, M, and nut N may be used to adjust the tension of said springs.

The effect of the internal gear of the drum A and the operation of the whole apparatus is as follows: If the cog-wheel D has thirty-six and the cog-wheel D' forty cogs, and the two pinions F F', which are of equal diameter, each twelve cogs, and if the shaft B is now rotated until the tumbling-shafts have made one complete revolution round the center of the shaft B, the pinions F, by the action of the cog-wheel D, will make $\frac{36}{12}=3$ complete revolutions, causing the pinions F' to make the same number of revolutions or to progress thirty-six teeth until the tumbling-shafts have returned to their original positions. The drum, therefore, is compelled to rotate for the distance of $40-36=4$ teeth for each revolution of the tumbling-shafts, or to make one tenth of a revolution for each revolution of the steering-wheel. It is obvious that by decreasing or increasing the difference between the number of teeth of the two wheels D D' the motion of the drum for each revolution of the shaft B can be decreased or increased at pleasure, and, in the same ratio, the power exerted by

the man at the steering wheel can be increased or decreased as much as may be desired. A strain exerted on the circumference of the drum will have no effect on the shaft B or on the steering-wheel, because the whole gear will be locked by the stationary wheel D. The steering-wheel, therefore, will not be affected by the sudden jerks of the rudder, and one man will be able, with the greatest ease, to work the wheel of the largest vessel; and, furthermore, by the action of the spring or springs in the interior of the drum and by the spring-blocks H, the rudder is made yielding and allowed to give to the force of the waves, and injury to it or to the other parts of the apparatus is prevented.

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

1. The arrangement, in combination with a steering apparatus, of a differential gear, substantially such as herein described, to operate, in combination with the steering-wheel and tiller or rudder, in the manner and for the purposes set forth.

2. The arrangement of a spring or springs in the interior of the drum, substantially as specified, in combination with the internal gear and with the tiller or rudder, constructed and operating in the manner and for the purposes as described.

3. The arrangement of the adjustable spring-blocks H, in combination with the drum A, rope G, and tiller I, constructed and operating as and for the purpose set forth.

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Witnesses:

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