

EMANUEL S. DREW.

Improved Steering Apparatus.

No. 118,176.

Patented August 15, 1871.

Fig. 1.

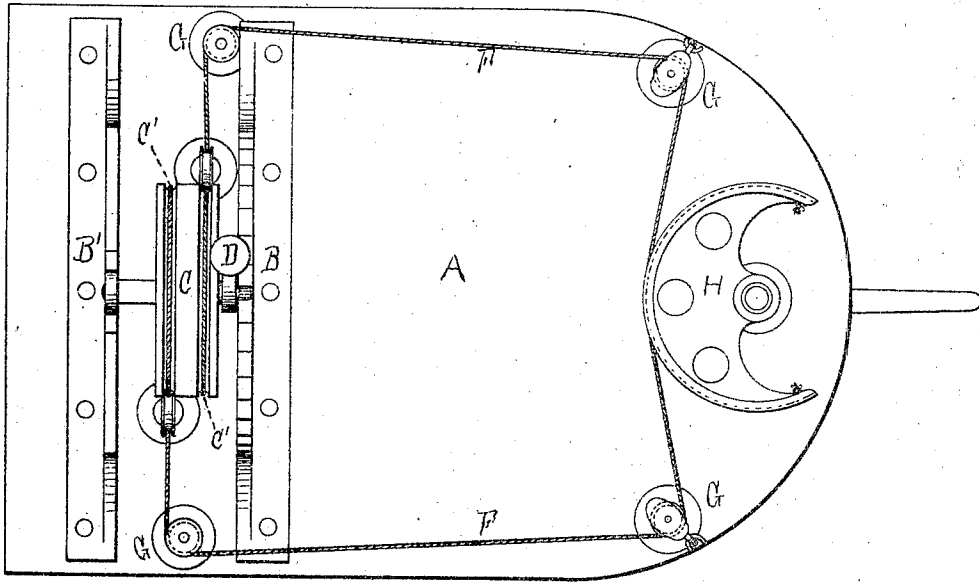
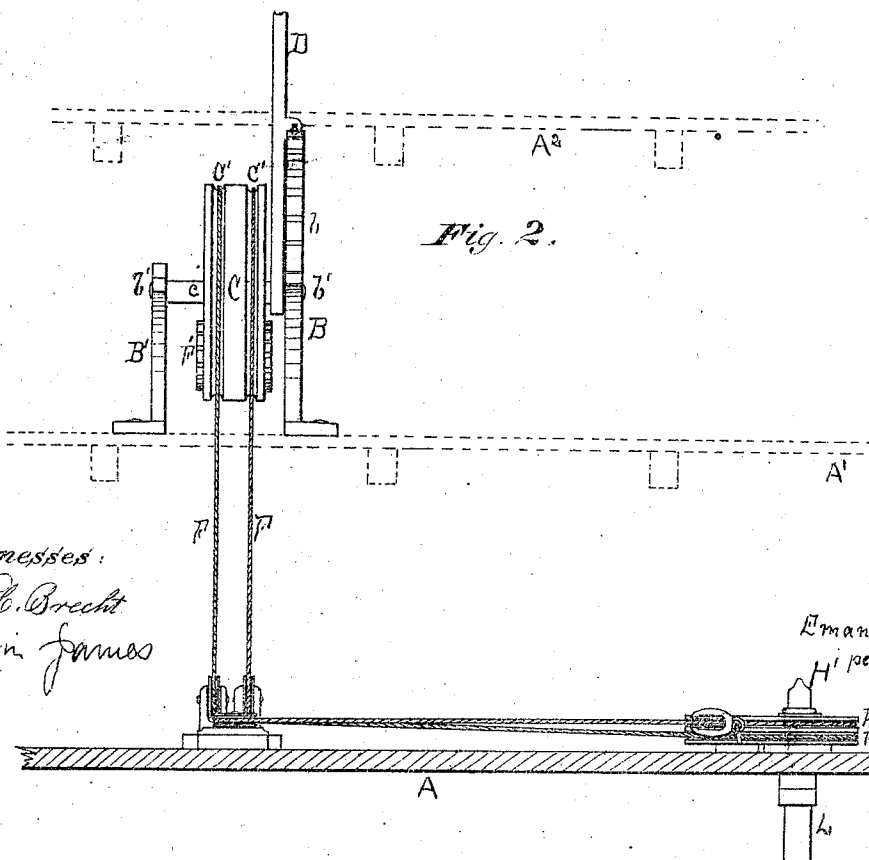


Fig. 2.



Witnesses:

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Emanuel S. Drew
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Fig. 5.

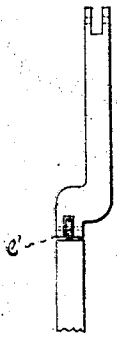


Fig. 4.

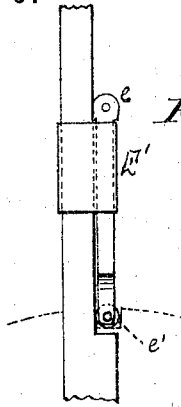
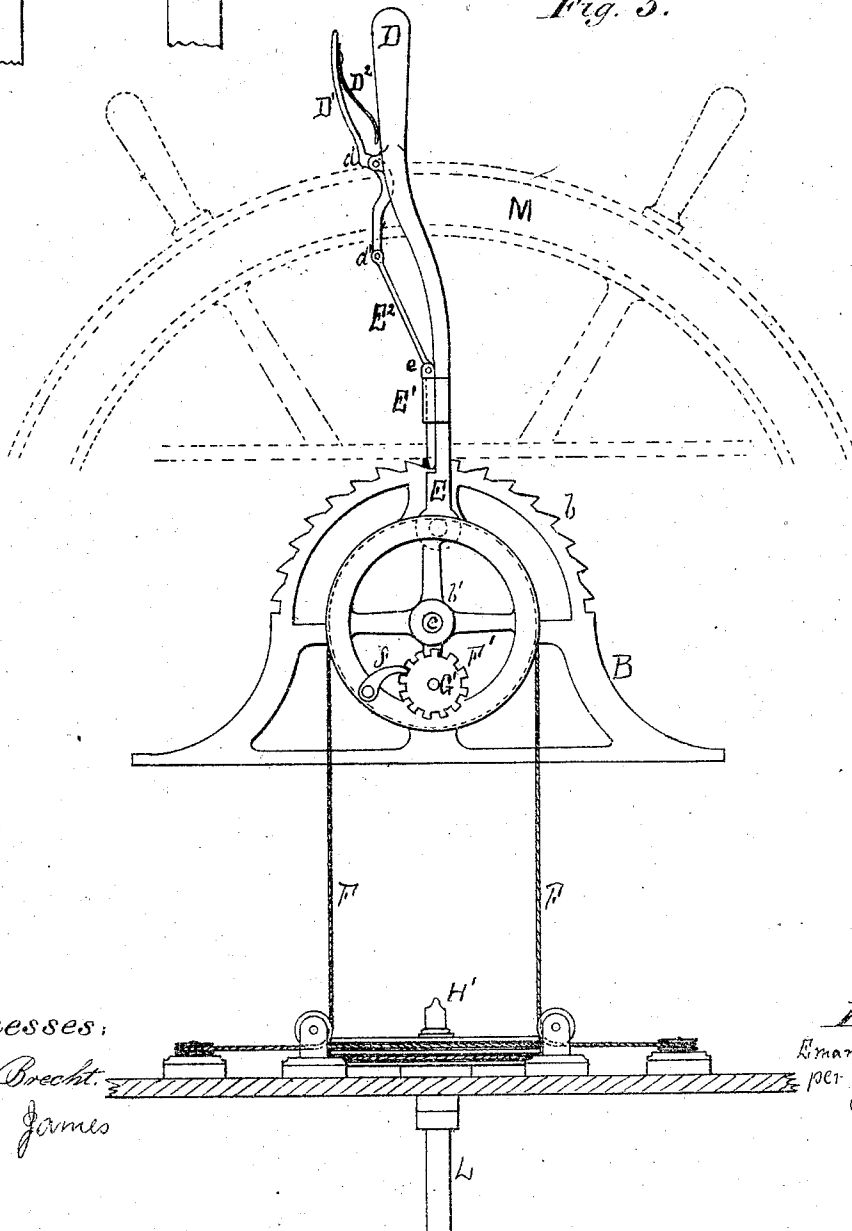


Fig. 3.



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UNITED STATES PATENT OFFICE.

EMANUEL S. DREW, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN STEERING APPARATUS.

Specification forming part of Letters Patent No. 118,176, dated August 15, 1871

To all whom it may concern:

Be it known that I, EMANUEL S. DREW, of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Steering Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing and the letters of reference marked thereon making part of this specification, in which—

Figure 1 is a top plan view. Fig. 2 is a side view, parts being removed. Fig. 3 is a reversed rear view, parts being removed. Fig. 4 is a rear view of the lower section of the lever above the ratchet-segment, the friction-roller being attached. Fig. 5 is a side view of the spring-pawl or dog with friction-roller attached. The drawing is made of a full-size scale.

The object of my invention is to provide a steering apparatus which shall be simple in its mechanism, durable and economical in its construction, and effective and reliable in its operation, and which can readily be applied to all vessels requiring a steering apparatus. The nature of my invention consists in connecting the tiller-ropes to a drum and tiller-disk of the same diameter, and in attaching to the drum an upright lever and the tiller-plate to the rudder-post in such manner as to secure the counter-leverage which will insure a perfect uniformity of action. The tiller-disk travels through the same arc of a circle in each of its movements that the drum does. Of course the rudder-post, which is its axle, is revolved precisely in the same degree that the drum-shaft is.

The great advantages of this combination are found: First, in the substitution of a simple drum and upright lever for the expensive and cumbersome steering-wheel and windlass now universally used. In thus simplifying and rendering entirely practical in my apparatus the immense power of the lever to the steering of vessels, I guarantee to the pilot the most positive mastery of the rudder, enabling him at any instant, and with a great saving of time and especially of labor, to instantly ship this rudder to any angle, and there hold it, without exertion on his part, so long as he may desire. This I accomplish through a ratchet-segment and spring-pawl or dog, the latter being attached to the lever, and can be arranged to be operated either

by the hand or foot. The tiller-ropes are attached to a drum and tiller-disk of the same diameter and run in the peripheries of each in opposite directions. These ropes being so connected as to secure their uniform movement, each rope is wound on the one exactly in the same degree as it is unwound from the other. This saves all lost motion in the operation of the apparatus, as the tiller-ropes are never slack, but under all circumstances perfectly taut, and consequently always in position to exert such a direct draft on the disk as to insure the instantaneous movement of the rudder. The taking up of the slack incident to the necessary stretch and wear of the ropes is provided for through two small ratchet windlasses to each of which one of the ropes is attached. These have their bearings in the faces of the drum, their ratchet and retaining-pawl being on the outside of the same and in such position as to be readily operated so as to tighten the ropes. Another great advantage of my improvement is this, and which is one of primary importance: when the apparatus is to be attached to vessels designed to navigate the waters of narrow or irregular rivers, the essential features of my combination are so connected and are so co-active in their operation that, the movement of one necessarily impelling all, a reliable and effective counter-leverage is secured, which permits of the rudder yielding as it is forced against any obstruction, and which avoids all danger of its being broken or permanently injured through such contact; and this self-acting movement on the part of the rudder is accomplished without in any manner disarranging the mechanism, and is due entirely, first, to the spring gearing by which the lever is held allowing of an automatic play, and the power which the rudder acting on its disk has to impart a reciprocal or return movement on the drum and upright lever.

The construction and operation of my invention are as follows:

In the drawing is illustrated a section of a vessel with my improved apparatus attached, the different features of the mechanism and their relative positions being distinctly shown. A is the lower or bottom deck; A¹, the upper or second; and A², the third; or in vessels which are only double-decked A² represents the floor of the pilot-house. B B' are two frames or stand-

ards constructed of metal or other suitable material, and are firmly bolted or otherwise attached to the upper deck A^1 immediately under the pilot-house, or in such relative position thereto as to give the steerman free access to and control of the upright lever D . The upper face of the standard-frame B projects above that of B' , and is provided with a ratchet-segment, b , as clearly shown in Figs. 2 and 3. C is a drum, and may be constructed of any suitable material. Within the nave of this drum C is permanently attached the axle-shaft c . This shaft c is secured between the standards B B' , and works in suitable journals b' b' secured thereon. These journal-boxes may be of the ordinary construction, or, if desired, they may be furnished with rollers or other anti-friction face-bearings. C' C' are two annular grooves which are cut in and encircle the periphery of the drum C . In these annular grooves C' C' rest and travel the tiller-ropes or chains F F , the grooves acting as guide surface-bearings for the same. D is an upright lever and is firmly keyed to the axle-shaft c of the drum C , and at such relative position thereon as to work between the drum and the standard B , as clearly shown in Fig. 2. In a suitable socket-bearing on the lever D , by means of a fulcrum-pin, d , is pivoted the hand-lever D^1 . E is an upright L-shaped pawl-lever or dog with a heavy horizontal head, and is secured so as to work on the face of the lever D by means of a sleeve or clasp-bearing, E^1 . E^2 is a connecting-rod, and is pivoted, by fulcrum-pins d' e , to the levers D^1 E . D^2 is a spring attached to the rear face of the lever D^1 , its free end bearing against the lever D . This spring is so secured and arranged that its natural tension shall always be exerted in securing a proper bite of the pawl-lever E in the teeth of the ratchet-segment b . The form of the lever D^1 and the pawl E and its various appliances, as well as its attachment to the lever D , is distinctly shown in Fig. 3; but I desire it understood that there is nothing arbitrary about the form or arrangement of the dog or pawl or its operating mechanism, as any ordinary style of retaining-pawl would accomplish the same result, and, instead of being freed from its bite on the ratchet-segment b through a hand-lever, D , an attachment might readily be applied by which it could be operated by the foot. The head of the pawl or dog may be recessed so as to receive and secure an anti-friction roller, e' , as clearly shown in Figs. 4 and 5. If preferred this spring-lever and pawl might be entirely dispensed with, and a lever, D , composed of a spring-rod, might be used which would mesh and lock in the ratchet-rack through its own elasticity, in which case, however, the rack would have to be at the side of the curved face of the standard B instead of on its upper face, as shown. F F are the tiller-ropes or chains, and are such as are now universally used. These ropes are passed through the drum C , and are secured to the axles of the ratchets F' F' . f f are spring-retaining pawls, and are arranged at such position as to act on the ratchets F' F' . G G are four swivel-pulleys, and are secured to the deck A , as shown, two being immediately under and on a vertical line with the drum C , and the other

two at the stem of the vessel, as clearly shown in Fig. 1. H is the tiller-plate, and is provided with two grooves or recesses, h h , in which rest and travel the chains or cords F F precisely as they do on the drum C . The tiller-plate or disk H is of segmental form and must be of exactly the same diameter as is the drum C , so that when the ropes F F are attached to the drum C and the tiller-plate H they will operate without creating slack, and which is due to the fact that, as the ropes are unwound from the drum, they are wound on the disk, and vice versa. H' is the nave of the tiller-plate, and is keyed to the rudder-head or post L in the usual manner. In Fig. 3 there is shown in dotted lines a half wheel, M , which on river steamers may be substituted for the lever. The only advantage of such substitution would be that the half wheel would furnish the steersman increased purchase.

The operation is as follows: The tiller-ropes or chains F F are attached to the ratchet-shafts G' G' and the tiller-disk H , as stated, and then drawn perfectly taut and held by the spring-pawl f , and which compels the ropes to travel in the grooves or channels h h and C' C' of the drum and tiller-disk. This being all arranged, we will presume the rudder to be at midship. The lever D then occupies the direct vertical position shown in Fig. 3, the pawl or dog E locking the same in position. Now, to steer the vessel you have simply to depress the lever either toward the larboard or starboard side of the vessel, as the case may be, which, of course, revolves the drum C . This movement of the drum, as the ropes F F run on the same in opposite directions, necessarily winds one and unwinds the other. But as these ropes are also attached to a tiller-disk of the same diameter as the drum, the tiller lets out one and takes up the other rope precisely in the same manner and degree that the drum does, and the result is that the ropes F F are never slackened by lost motion, but always held perfectly taut. The lever being moved to the desired point or degree—and the degrees can be indicated on the ratchet-segment b —the rudder is locked in position by simply the pawl E falling into one of the teeth of the ratchet-rack. Throughout all the movements of the apparatus the lever controls the drum and the tiller-disk, the rudder-head or post acting on the same as counter-levers, and which compels the rudder to respond to the slightest movement of the lever, as I have said, without lost motion, and this, too, no matter how sudden or directly opposite the motion may be. This arrangement, it will be seen, obviates all necessity of using the cumbersome and heavy steering-wheel. No portion of the mechanism except the lever enters the pilot-house, it working in a longitudinal slot therein, and through its well-known power gives the pilot the most positive mastery of the rudder. The power of this lever depends on its length and the diameter of the drum, which, in connection with the great saving of labor in its operation and its reliable and instantaneous movement, secures to the apparatus the most positive advantages.

Another and most important feature of my ap-

paratus is this: In turning in narrow streams, should the rudder strike the shore it will instantly yield, and, acting on its tiller-disk through the ropes F F, a reciprocal or return movement is imparted to the drum and lever, the spring-dog yielding so as to permit this automatic movement. This same action occurs when the rudder comes in contact with a heavy wave or other obstacle.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The drum C and tiller-disk H of uniform diameters, and so connected by tiller-ropes as to act substantially as described.

2. The drum C, lever D, either with or without its spring-pawl attachment, ropes F F, tiller-plate

H, and rudder L, when the same are so combined and arranged as to operate substantially as described.

3. The drum C, lever D, spring-lever pawl D¹ D² E E¹, and ratchet-segment *b*, when the same are so connected with the tiller-ropes of a steering apparatus as to operate the same, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMANUEL S. DREW.

Witnesses:

JOS. T. K. PLANT,

W. A. BOSS.