

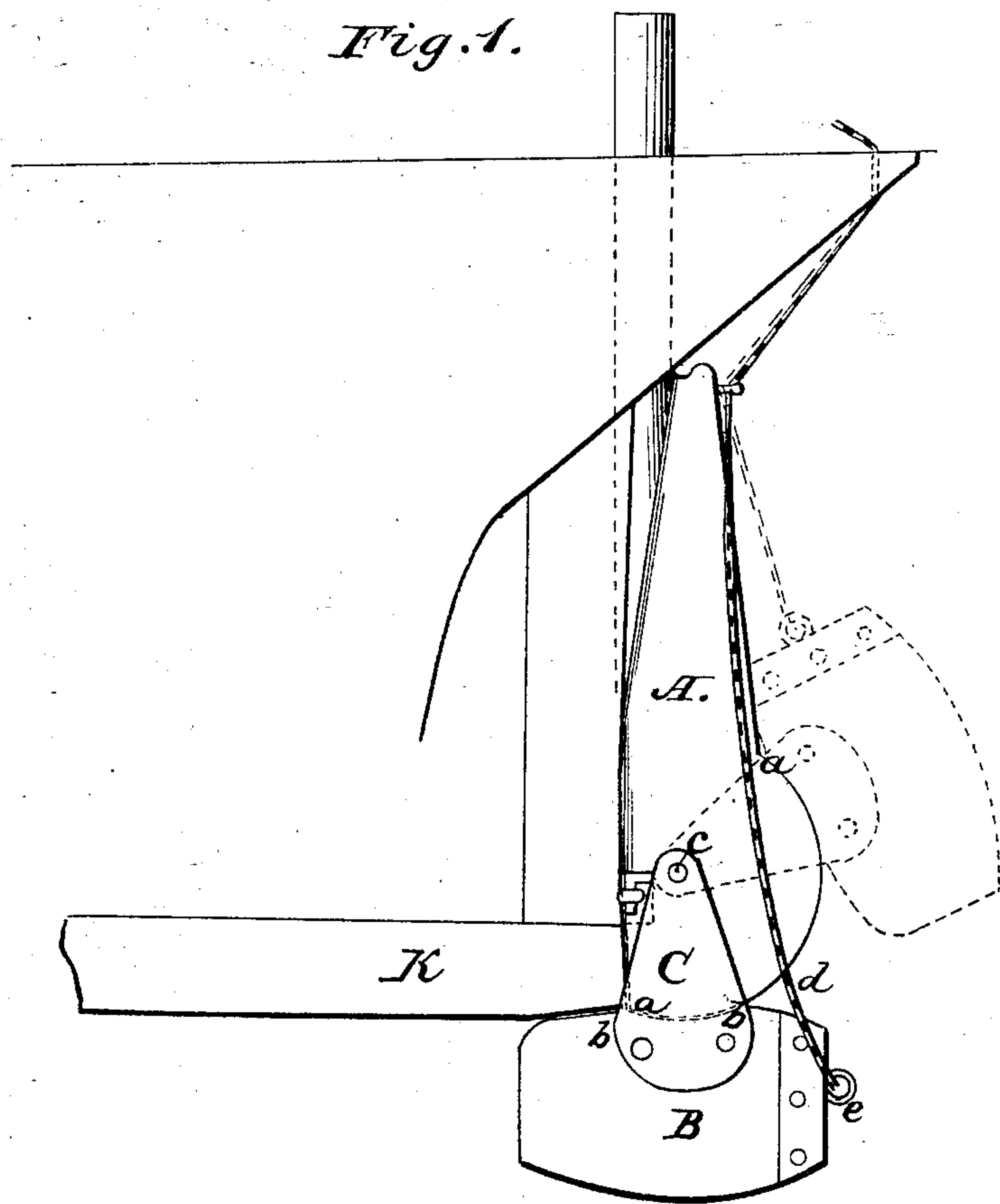
*A. B. Crossman..*

*Steering.*

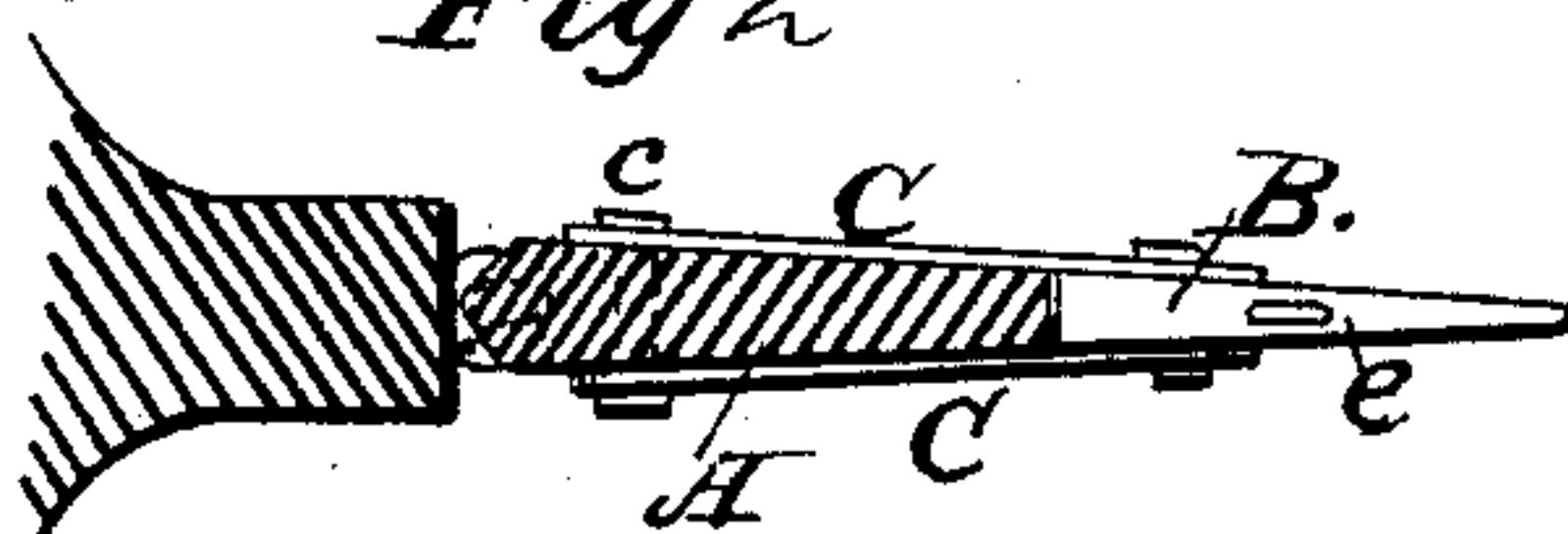
*N<sup>o</sup> 16,352.*

*Patented Jan. 6, 1857.*

*Fig. 1.*



*Fig 2*



# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN RUDDERS.

Specification forming part of Letters Patent No. 16,352, dated January 6, 1857.

*To all whom it may concern:*

Be it known that I, A. B. CROSSMAN, of Huntington, in the county of Suffolk and State of New York, have invented a new and useful Improvement in Rudders for Vessels; 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 part of this specification, in which—

Figure 1 is a side view of the stern of a vessel with a rudder constructed according to my invention. Fig. 2 is a horizontal section of the stern-post and rudder.

Similar letters of reference indicate corresponding parts in both figures.

This invention consists in providing the lower part of the rudder with an extra or extension piece, one end of which extends forward under the keel of the vessel and beyond the pintles of the rudder in such a manner as to present a rudder-surface upon both sides of the pintles and thus render the rudder self-balancing.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is that part of my improved rudder which may be termed the "main rudder," whose construction is the same as that of the common rudder, and so is the mode of its attachment to the vessel; but it is made of less width than would be necessary for a common rudder, on account of its being furnished with what may be termed the "movable extension-piece" B, and is made with its heel of the form of a portion of a circle, as shown at *a a*, Fig. 1. The movable extension-piece B may be made of wood or iron. Its form may be varied; but the side next the main rudder A must be hollowed out for a portion of its length, as shown at *b b*, Fig. 1, to fit to the circular heel of the main rudder. It has attached firmly to it two check-plates C C, which embrace the heel of the main rudder between them, and are pivoted to the main rudder by a bolt or pin *c* at the central point from which the circular portion *a a* of the heel is described. This mode of connecting the movable extension-piece B with the main rudder A allows it to drop under the main rudder and partly under the keel K of the vessel, as shown in black outline in Fig. 1, or to be swung up in rear of it till it bears firmly

against that part of its back above the circular portion *a a*, as shown in red outline in the same figure. The movable extension-piece has attached to it a rope *d*, or a chain or tackle of any suitable kind, to enable it to be raised up to the last-described position by a person or persons upon the deck of the vessel, and is intended to be made of such weight or weighted in such manner that it will drop to the first-described position when the rope, chain, or tackle is slacked. It should be made of the greatest weight or weighted, as shown in the drawings, on the side *e*, in order that when it is lowered it may counteract the tendency of the resistance and friction of the water to throw it back or raise it.

When the vessel to which the improved rudder is attached enters or is about to enter shoal water, the movable extension-piece B of the rudder is to be raised to the position shown in red outline in Fig. 1; but when it enters deep water the movable extension-piece is lowered to the position shown in black outline. If, when the movable extension-piece is lowered, it should touch the bottom as the vessel passes over a shoal, it will swing backward and upward as the vessel moves onward, and thus injury to it will be prevented. By making the movable extension-piece to extend some distance forward of the pintles or axis of motion of the rudder it is rendered self-balancing, as the pressure of the water, acting on the part so extended forward, exerts a tendency to move the rudder in the opposite direction to that acting on the main rudder and the other part of the extension-piece, and thus the effect of the pressure on the tiller or steering apparatus is reduced.

It is well known that great difficulty usually exists in the steering of vessels, especially those of large dimensions, during storms or in rough seas or when passing through rapid currents. The sudden surge of a sea against ships' rudders has been known to revolve the tiller-wheel so powerfully and instantaneously as to knock down the helmsman and break his limbs, and in some cases to throw him overboard. In nearly all ships it is the practice, in case of heavy storms, to double or quadruple the number of men in charge of the tiller, and also to attach extra gearing, consisting of ropes and tackles, to aid in guiding the tiller and keep it under control.



By the use of my attachment the rudder is made either wholly or in part self-balancing, as desired, so that, no matter how furious the storm, the tiller cannot be suddenly jerked from side to side, with so much proportionate violence as ordinary rudders, since the water acts, as it were, against two arms of a lever whose fulcrum is between the ends of the lever.

In my device that part of the extension-piece B which projects forward of the rudder-pintles may be regarded as one portion of the lever, and that portion in the rear of the pintles, together with the main rudder, the other portion of the lever, the pintles being the fulcrum. The rudder will be more or less self-balancing, according as the extension-piece is hung, so as to bring the pintles or fulcrum more or less near the center of the combined resisting-surface of the main rudder and the extension-piece.

By the attachment of my improvement to ships' rudders the casualties and difficulties above named are entirely obviated, since one man is enabled to steer the largest vessel in the fiercest storm with the most perfect ease, and the men who would otherwise be required at the helm can attend to other duties. Many vessels have been driven ashore and hundreds of lives lost, to say nothing of property, owing to the fact that so many men were required at the helm that the sails could not be properly worked. Again, by the sudden jibing of the sails, owing to the want of command over the tiller, masts and yards, with sailors upon them engaged in reefing, have been thrown into the sea.

In the navigation of the St. Lawrence River at the present day it is required on many of the steam-boats to have from eight to twelve men at the helm during the passage through the rapids, such is the great difficulty of steering. No such difficulty exists where my improvement is used.

I distinctly disclaim the making of a rudder in two parts, one of which is movable, for devices of this kind have long been known. An example is seen in Newton's London Journal, conjoined series, Vol. 26, Page 158, Plate 9, Figs. 7 and 8. In this device the main rudder is provided with a movable attachment on its rear, so arranged that when the rudder strikes a rock or shoal the movable piece will rise and prevent injury either to vessel or rudder.

Another example is seen in a French work published by the French Government at Paris in 1824, entitled "Memoirs of American Steam Vessels, by M. M. Morriestier." This consists of a movable piece attached at the rear of the rudder and so arranged that it can be raised and lowered, so as to extend at pleasure the length of rudder-surface presented to the water, and thus cause the vessel to obey the helm quicker. In smooth water this device

is perhaps advantageous; but it is evident that the power required for steering will be much increased by widening the rudder-surface. This device therefore augments the very evil which mine is intended to obviate.

In the navigation of flat-bottomed vessels great difficulty is experienced in steering when running before the wind by the yawing of the stern in consequence of the absence of any resisting medium against the water at that part of the vessel.

My improvement is well adapted for application to such vessels, as it will act like a center-board by projecting down below the keel, and, being placed at the stern, it will therefore prevent the yawing or leeway of that part of the vessel. The device above cited from the French work could not be thus advantageously used, although a small portion of the extra rear piece projects below the line of the keel, because the surface of the rudder is extended wholly in the rear of the pintles or fulcrum, so that the rudder is rendered more difficult of control the stronger the wind blows or the rougher the sea becomes; but my improvement renders the rudder self-balancing, so that it is easily controlled, no matter what the state of the wind or water.

Vessels are not unfrequently disabled or lost by wrenching off the rudder-head. The force of a wave dashing against the perpendicular surface of the ordinary rudder is very great, and this great force has to be counterbalanced by an equal amount of force applied to the tiller in a contrary direction. In my rudder no such thing can happen, because the upper portion of it—that portion which is alone subject to the dashing of the sea—may be small and round, the steering-surface of the rudder being down near the keel where there can be no dash of the sea against it, and even if there should be any such effect it does not extend to the rudder-head or the tiller.

Again, vessels are frequently lost by collisions that might be avoided if the movement of the rudder could be effected instantaneously, but which is rendered impossible in the ordinary rudder by the gearing necessary to control it; but in mine no gearing is required, and the helm is changed almost as quick as thought.

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

The attachment to the rudder A of an extension-piece B, when the said extension-piece is so combined and employed as to render the rudder wholly or partially self-balancing, as set forth.

A. B. CROSSMAN.

Witnesses:

JAMES F. BUCKLEY,  
W. TUSCH.