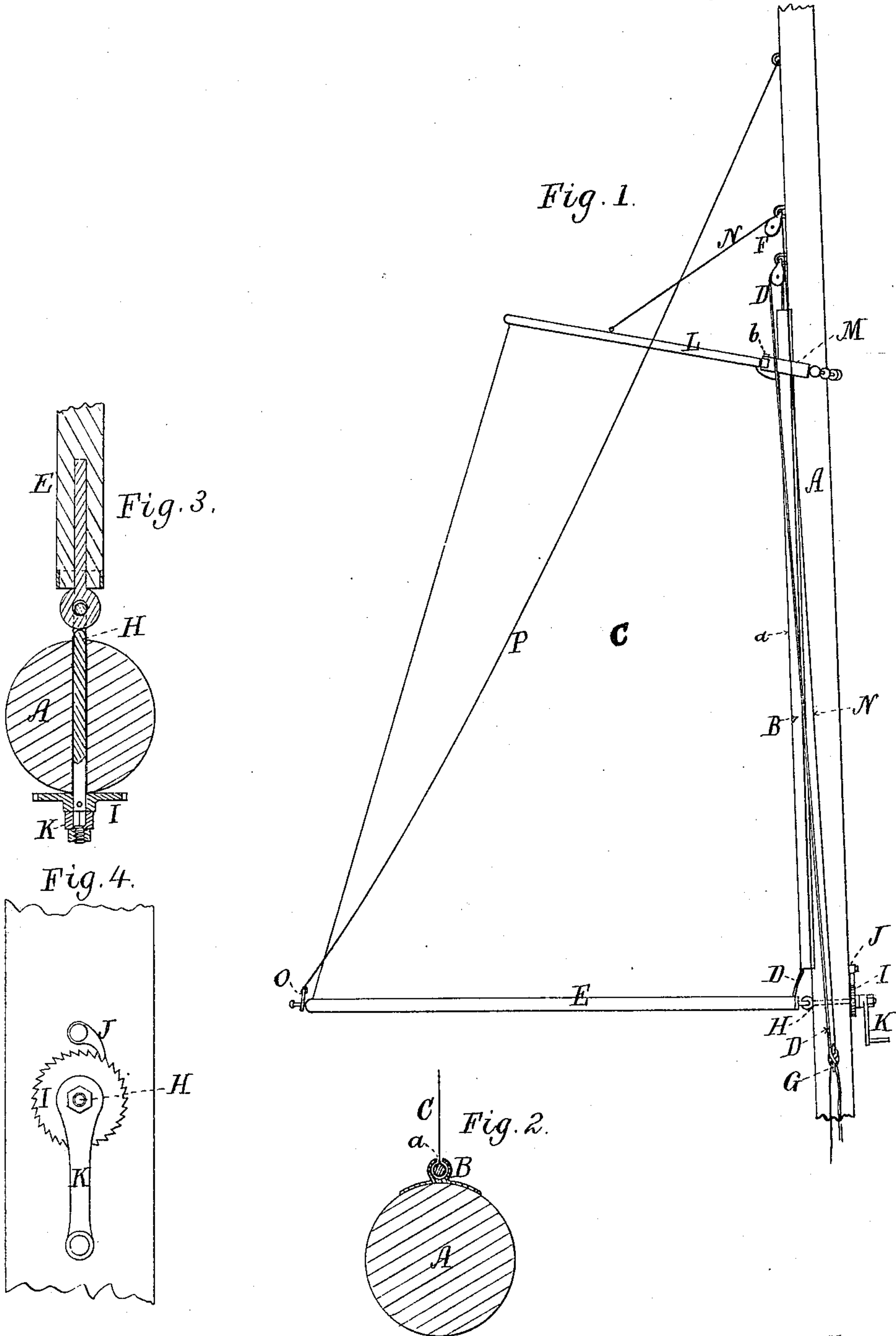


(No Model.)

M. W. COSTELLO.  
REEFING AND FURLING SAILS.

No. 436,169.

Patented Sept. 9, 1890.



Witnesses.

*W. E. Piper*  
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*by S. V. Piper, atty.*

# UNITED STATES PATENT OFFICE.

MICHAEL W. COSTELLO, OF BOSTON, MASSACHUSETTS.

## REEFING AND FURLING SAILS.

SPECIFICATION forming part of Letters Patent No. 436,169, dated September 9, 1890.

Application filed May 23, 1890. Serial No. 352,913. (No model.)

*To all whom it may concern:*

Be it known that I, MICHAEL W. COSTELLO, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Reefing and Folding Sails; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side view of a mast and sail provided with my improvement. Fig. 2 is a horizontal section of the mast and of a portion of the sail, showing their connection. Fig. 3 is a horizontal section of the mast, taken through the shaft connecting it to the boom, a portion of the boom also being shown. Fig. 4 is a front view of the lower portion of the mast, showing the crank and the ratchet and pawl.

The nature of my invention is defined in the claims hereinafter presented.

In carrying out my invention I apply to the mast A a tubular guide B, somewhat longer than the height of the sail and slitted through-out its length at *a*. Through said slit the adjacent edge of the sail C extends and is secured to a line or rope D, arranged within the guide and of larger diameter than the width of the said slit, said rope and the lower edge of the sail being secured to the boom E.

The rope D, passing upward out of the guide, is carried through a pulley-block F, attached to the mast, and then downward, and when the sail is set is belayed to a cleat G near the foot of the mast.

The boom E is represented as cylindrical, and is connected by a universal joint to a shaft H, extending through the mast, a ratchet-wheel I and a crank K being fixed to said shaft on its outer end. A pawl J is pivoted to the mast to engage with the ratchet. (See Figs. 1 and 4.)

The gaff L, to which the head of the sail is bent, is jointed, at *b*, to a fork M, adapted to slide on the guide and the mast, and is con-

nected to the mast by a half ring or grommet strung with balls in the usual manner to prevent friction. Halyards for setting the sail are to be applied to the gaff in the usual manner, one being shown at N, Fig. 1.

The outer end of the boom is provided with a journal, to which is applied an eye O, attached to the lower end of a guy P, the latter being secured at its upper end to the mast. Said guy when taut is to support the boom in line with the shaft.

To reef or to fold the sail, unhitch the halyards and the line D and lower the outer end of the boom E till sustained by the guy P. Then engage the pawl with the ratchet and wind the sail on the boom by means of the crank, maintaining at the same time sufficient friction on the halyards and rope D to keep the sail smooth and cause it to properly wind on the boom.

This way of reefing a sail can be very quickly and easily done, and the sail can be reduced in size as little or as much as circumstances may require and with much less expenditure of manual power than is required under the old method of reefing, and it has been found to work to excellent advantage.

Furthermore, it will be seen that by my improvement I dispense with the hoops usually employed to connect the sail to the mast, and therefore do away with the friction incident thereto when raising the sail, and also with the necessity of greasing the mast. Therefore the mast can be painted and will present a much neater appearance than when hoops are employed.

What I claim is—

1. In a navigable vessel, the combination of a fore-and-aft sail enlarged in its edge next the mast and secured at its head and foot to a gaff and a boom, respectively, with a mast provided with a slitted and tubular guide fixed thereto, and a shaft supported therein and provided with a ratchet and a crank, said shaft being connected by a universal joint to the boom, a pawl operating with said ratchet, a guy supporting the boom at its outer end, and the sail being connected to the guide and adapted to be moved therein and provided with means for setting it, as and for the purpose explained.



2. In a navigable vessel, a mast provided with a tubular and slitted guide fixed thereto, a shaft supported in said mast and connected to a boom by a universal joint, said shaft provided with a ratchet and a crank, a pawl pivoted to the mast engaging said ratchet, and a guy supporting one end of the boom, in combination with a sail enlarged in its edge next

the mast and adapted to move in said guide, as and for the purpose explained. 10

In testimony whereof I affix my signature in presence of two witnesses.

MICHAEL W. COSTELLO.

Witnesses:

S. N. PIPER,

C. F. DANIELS.