June 22, 1926. 1,589,488

E. W. SMITH

SAIL RIGGING

Filed March 24, 1924

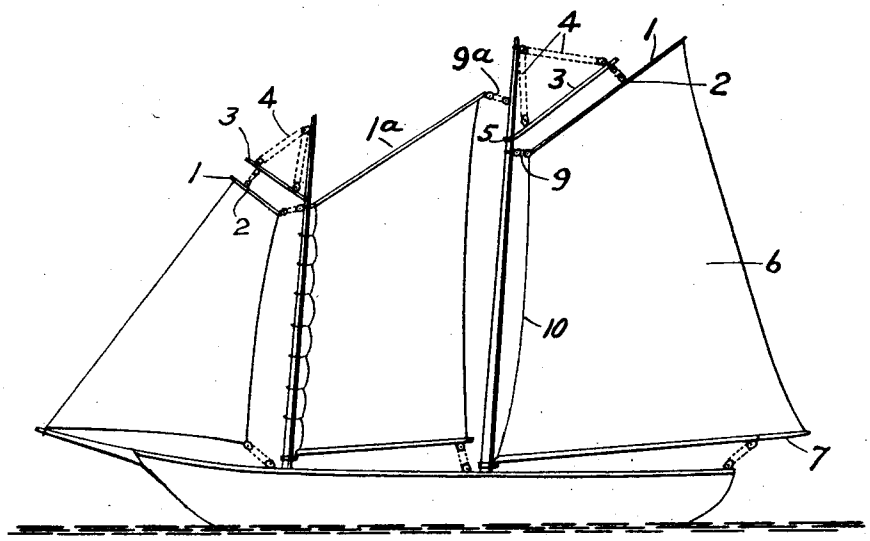


FIG. 1.

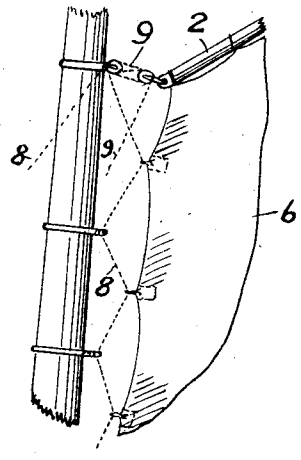


FIG. 3.

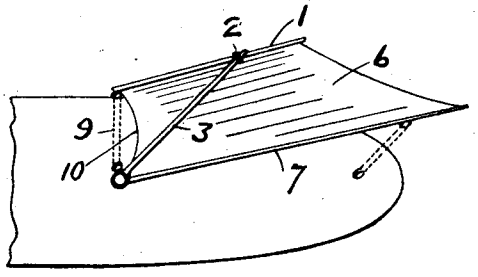


FIG. 2.

INVENTOR

Edward W. Smith

BY

Augustus B. Stoughton.

ATTORNEY.

WITNESS:

Robt. R. Mitchell.

Patented June 22, 1926. 1,589,488

UNITED STATES PATENT OFFICE.

EDWARD W. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

SAIL RIGGING.

Application filed March 24, 1924. Serial No. 701,317.

This invention has for its object the rigging of a sail in such a manner as to cause a boat so rigged to make better speed to windward than when rigged in ordinary ways.

To explain the principles involved, I will first point out the defect in existing rigs, which I propose to remedy, and then the means to be employed to that end.

In the ordinary fore and aft, or "schooner rig", which is that most commonly employed for fast sailing vessels in this country and Europe, the larger sails, of which there may be one or more, are rigged in such a way that at its upper edge the sail is fastened to a spar, known as the gaff, which in turn is held in position by a rope tackle (halyards) and by resting at its lower end against the mast, where it is held in position by the jaws. The lower edge of the sail is fastened to the boom, which in turn is held usually by a universal joint to the mast at the inner end, and by a rope tackle (the sheet) at the outer end. The forward edge of the sail (the luff) is attached to the mast by a means of hoops or equivalent, while the sternmost edge, (the leach) is left free.

When in action, sailing on the wind (or tacking) the sheet is hauled close, so that the boom takes a position nearly parallel to the keel of the boat, and the boat is headed as near into the wind as possible keeping the sail full all the while. If headed too near into the direction of the wind the sail shakes, showing that it is not being fully acted upon by the wind, and the boat quickly loses speed. The critical point in sailing to windward (or tacking) is thus the closeness to the direction of the wind with which the boat is able to point, while keeping the sail full of wind. The principle is so well understood that further discussion of it is unnecessary.

Further, it is common knowledge among any who have experience in sailing, that the usual fore and aft rig is defective in that the gaff never remains at the same horizontal angle to the keel as the boom, but by reason of having its outer end free always swings out much further, so as to assume a greater angle than the boom. It is quite manifest that while the boom is quite "flat" or nearly parallel with the line of the keel, the gaff is decidedly "off" the wind, forming a much greater angle (horizontally) with the keel. It is quite plain that the position of the gaff is what actually determines how close to the wind it is possible to sail, the sail always shaking slightly below the gaff and near the mast.

The present invention has for one of its objects the rigging of the sail in such a manner that the position of the gaff as well as of the boom may at all times be controlled, and also the main portion of the sail between the two, to the end that every part of the sail may be made to assume approximately the same angle to the keel. It is quite obvious that such an arrangement will permit of sailing closer to the wind and hence of going to windward with greater speed. In the following description reference will be made to the accompanying drawings forming part hereof and in which

Figure 1 is an elevational view diagrammatically illustrating an embodiment of the invention.

Fig. 2 is a top or plan view, and

Fig. 3 is an elevation.

For the accomplishment of the purpose above set forth, the gaff proper 1 has its jaws removed and is suspended at a point 2 from an auxiliary gaff 3, which will henceforward be designated as a "jack" for avoiding confusion. The jack 3 is suspended by halyards 4 as usual, and is free to swing partially around the mast, upon which it rests by means of its jaws 5. The sail is held between gaff 1 and boom 7 as usual, but the hoops attaching it to the mast are either lacking, Fig. 2, or are so attached by a running line 8, Fig. 3, that the luff of the sail may be either drawn close to the mast, or allowed to slack away perfectly free, at will. A line 9 which may be designated a "gaff sheet" permits similarly of drawing the lower end of the gaff close to the mast, or slacking it away as occasion demands.

It is obvious that if the point of suspension 2 of the gaff 1 from the jack 3 is appropriately placed, when a wind fills the sail from one side, the forward end of the gaff will swing to leeward to an extent which may be controlled by the gaff sheet 9; and thus it is possible to control its position and maintain it always approximately in the same plane as the boom. Fig. 2 shows the relative position of the boom, gaff and jack, as viewed from above in line with the mast. The gaff sheet 9 furnishes the means for maintaining the gaff 1 substantially in the same plane as the boom 7, or the projections of the gaff and the boom on the horizontal

plane make the same angle with the vertical medial plane of the ship. The jack 3 will, of course, swing to leeward, as the gaff does in the ordinary fore and aft rig; but the gaff 1 and with it the sail 6 may now be held in any desired position.

From the foregoing description it is evident that the boat may be pointed closer to the wind than heretofore while maintaining the sail perfectly "full", and that the rig described thus enables a boat to make much better progress to windward.

It should be noted that when running free, that is, with the boom slacked out considerably, the close alignment of gaff and boom is not so neccessary as when close hauled and that in such case it may be more convenient to pull in the gaff sheet close for the purpose of steadying the gaff.

Also it should be noted that by making the luff 10 of the sail slightly curved, the forward part of the sail may be held more nearly flat, and excessive bagginess prevented. I am, of course, aware that some bagginess will always be present and will prevent the maintenance of all parts of the sail at exactly the same angle with the keel.

In Fig. 1 a two masted vessel is shown, with mainsail and modified jib rigged as described, while the foresail is rigged much as usual, but the gaff 1^a is controlled by a sheet 9^a from its extremity (peak) to the adjacent main mast.

It will be noticed that the ordinary "square rig" largely fulfills the condition of controlling the angle of the sails to the keel, at all points. It is, however, subject to limitations, especially, that the sails cannot be so trimmed as to bring them at all near parallelism with the keel, and that in tacking it is necessary to brace them around so that for a time they are square to the wind, thus much reducing, if not entirely stopping the headway of the vessel.

It will be obvious to those skilled in the art that modifications may be made in details of construction and arrangement and in matters of mere form without departing from the spirit of the invention which is not limited as to such matters or otherwise than as the prior art and the appended claims may require.

I claim:

1. In a boat a sail free at the fore and aft edges thereof, a boom attached at the lower edge of the sail, a gaff attached at the upper edge of the sail, a spar from which the gaff is hung pivotally, a mast, the inner end of the gaff being clear of the mast, and an adjustable attachment for holding the inner end of the gaff in definite and controllable relation to the mast.

2. In a boat a boom a gaff, means for controlling the gaff, a sail attached to the boom at its lower edge and to the controllable gaff at its upper edge, and means whereby the edge of the sail adjacent the mast may be drawn close to the mast or made entirely free therefrom.

3. In a boat a boom, a gaff, a sail attached to the boom at its lower edge and to the gaff at its upper edge, means for independently controlling the angular position of both boom and gaff, and means for hauling the front edge (luff) of the sail close to the mast and for letting it off free, substantially as described.

EDWARD W. SMITH.